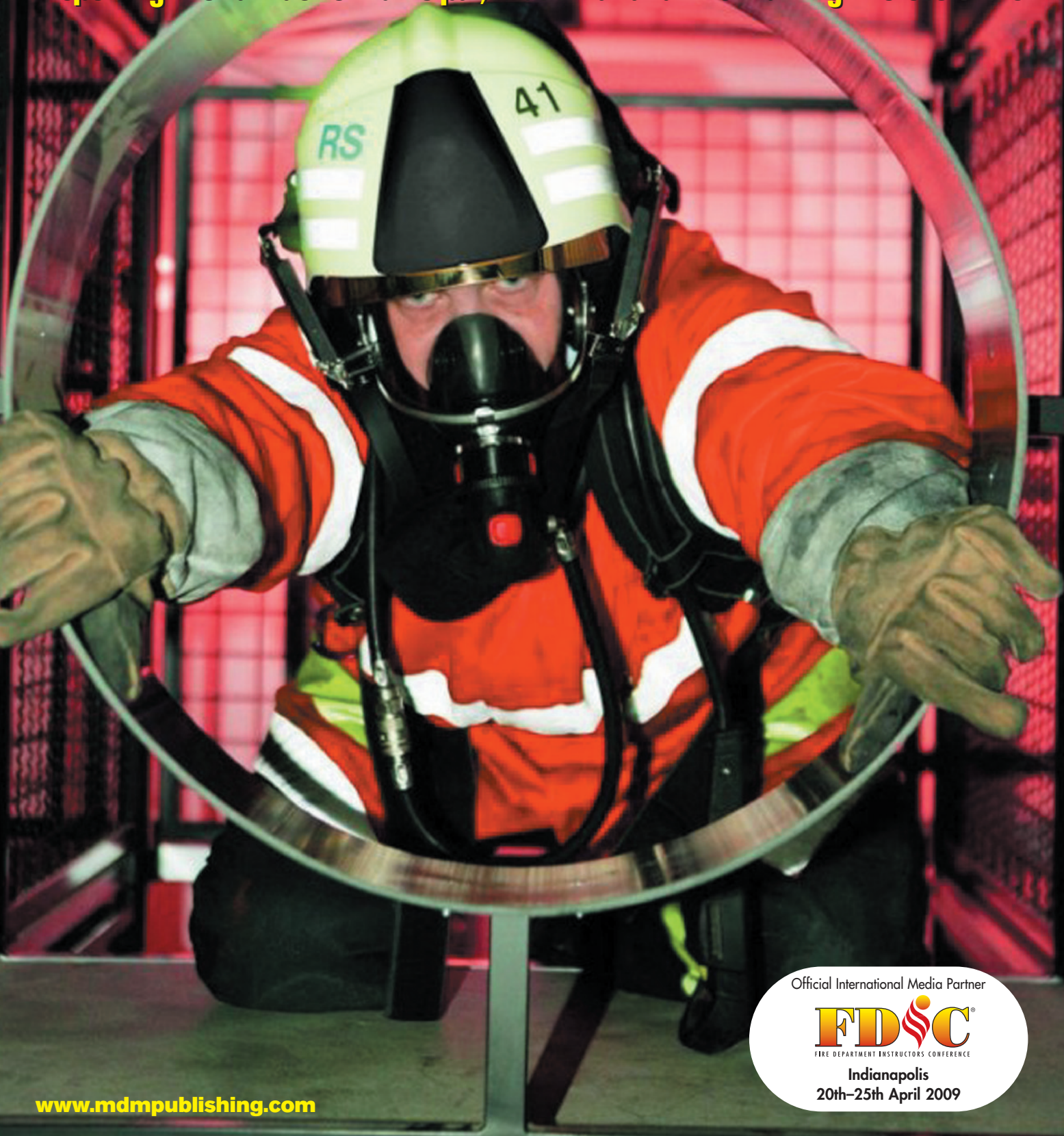


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INTERNATIONAL FIRE FIGHTER

Reporting Worldwide to Municipal, Industrial and Fire Training Professionals



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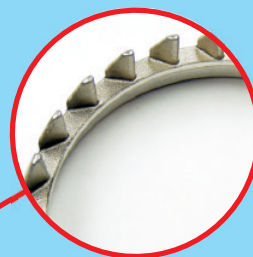


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New lightweight Advanced Carrying System (ACSF & ACSfx) for Scott SCBA

Providing the professional firefighter with greater comfort and total flexibility

SCOTT HEALTH & SAFETY announce the launch of the new innovative lightweight Advanced Carrying System (ACSF & ACSfx), which has been designed specifically to meet the changing needs of the professional fire services. Approved to prEN137: 2002 Class11, incorporating the stringent Flame Engulfment Test, the ACSf & ACSfx are refined to unequalled levels of performance and user comfort.

Scott Health & Safety's new ACSf & ACSfx is significantly lighter than any other carrying system in its class and is the first system in the world to incorporate ThermoFlex™ technology to create a unique sculptured soft back plate that provides the ultimate in comfort, ease of movement and contributes to reducing wearer fatigue. The ergonomically sculptured, soft back plate is designed and moulded to fit the spine and back muscles and was developed following intensive research with osteopaths, fabric and industrial technologists.

The harness incorporates high visibility reflected threading and has fully adjustable padded shoulder straps, a waistband featuring large buckles for easy operation with gloved hands in fast donning and doffing, plus D Rings that allow fast and easy connection of other equipment to the webbing or straps. A rapid connect cylinder band allows for adjustment or change out of cylinder in seconds, which is obviously beneficial in any fireground operations.

The ACSfx combines all the features of the ACSf, but also has an adjustable waist belt and extending back plate that can be adapted to suit the height of the wearer.

Lower Through Life Costs

The ACS harness and cylinder band is manufactured from extremely durable 100% Kevlar flame retardant webbing with corrosion resistant nickel-plated components that are user serviceable, low cost and simple to maintain. All elements of the set are designed to allow for possible future upgrade with minimal cost.

Easy to keep clean, both the back plate and harness can be washed at the same time as turnout gear, and the new hardwearing fabric material used in manufacturing is approved to maintain its flame retardant qualities for 50 washes at 90°C. A washing bag can be included to protect the harness and washing machine.

High performance pneumatics

At the heart of the ACS set is a simple, high performance and reliable two-stage pneumatic system. A first breath activated positive pressure demand valve provides low breathing resistance and excellent dynamic performance – particularly at high flow rates. A first stage pressure reducing valve features only two moving parts and accepts cylinder pressures up to 300 bar without adjustment.

No tools are necessary to remove the pneumatics as this can be achieved by simply rotating the pneumatics 90 degrees to disengage from the mounting.

The system includes a robustly designed



shoulder mounted pressure indicator with photo luminescent face markings for low-light legibility and a warning whistle with an operating pressure of 55 bar.

The design and manufacture of the back plate

enables bespoke tailored sets to be made in a variety of colours and corporate branding to meet individual requirements. All sets are approved to international standards and there is wide choice of cylinders and facemasks including Vision 3 and Promask PP ranges.

With over one million firefighters worldwide trusting in the rugged dependability and cutting edge technology of Scott Breathing Apparatus, the new Advanced Carrying System (ACSF & ACSfx) is set to become the industry standard carrier for SCBA in the fire fighting industry.

Full details are available from Scott Health & Safety or comprehensive information can be found at www.scottsafety.com

PBI Matrix® Arrives in Europe – Copenhagen Makes the Switch to the Next Generation in Firefighter Protection

Extensive wear trials across Europe confirmed what firefighters in U.S.A. and Canada have been experiencing for the last five years ... a new, never before seen rise in personal protection, comfort and durability in firefighting bunker gear. PBI PERFORMANCE PRODUCTS is proud to declare that PBI MATRIX® is now produced, marketed and commercial available exclusively from licensed partners throughout Europe.

PBI Matrix – The Power Grid – is a patented blend of PBI Gold reinforced with a durable matrix of high strength aramid filaments. This innovation takes PBI Gold's proven protective characteristics to another level by combining unmatched flame and thermal protection with unsurpassed strength and durability. This revolutionary outer shell is lightweight, fast drying, and offers superior comfort and reliability. Tough and rugged, PBI Matrix answers the call and remains service worthy by providing increased resistance to rips, tears and abrasions. Available in traditional gold, PBI Matrix raises the gold standard when it comes to personal protection.

PBI Performance Products is also proud to recognize Copenhagen, Denmark as the first Metro European brigade to make the switch over to this



new revolutionary outer shell fabric.

The Danish capital received their first set of PBI Matrix bunker gear back in August. In addition, many other brigades throughout Europe have announced that they too will or already have begun to upgrade their firefighters personal protection to PBI Matrix. Those cities will also be recognized as they begin to receive their bunker gear over the next few months.

As the world's only producer of high performance PBI fiber, the staff at PBI is dedicated to analyzing and meeting the needs of each market we serve," says Helmut Zepf. "We strive to work with our partners and their clients to continue to develop innovative ideas and solutions, to meet each markets unique needs for personal protection."

PBI Matrix and PBI Gold fabrics continue to set the highest standards for personal protection by combining unmatched thermal protection with superior comfort and durability.

For more information about where you can source bunker gear and other commercially available PBI fabrics, contact Helmut Zepf, Director of Marketing & Sales PBI Europe at 49 (0) 941 70 54 370. Email: Helmut.Zepf@pbiproducts.com or visit the company website at www.pbiproducts.com

Weber Hydraulik Gmbh launches state of the art hydraulic power unit at Intersec

Weber Hydraulik Gmbh, a leading European manufacturer of rescue tools for the world's fire brigades, proudly launched their new Hydraulic Power Unit the V-Ecosilent 22-54 at the Intersec trade fair and conference held recently in Dubai U.A.E. Mark Bathard, the editor of *International Fire Fighter*, stopped by Weber Hydraulik's booth to take a closer look at this modern marvel of engineering technology.

The V-ecosilent 22-54

Weber Hydraulik's representative on the booth, Reiner Anritter explained about the leading features of the new power unit. First and foremost he explained about the compactness of the unit. The V-Ecosilent measures just 205mm by 445mm and weighs in at a mere 24.9 kg including oil which means that this unit is very easy to carry around. There is also no need for external fuel tanks as the V-Ecosilent incorporates a built in fuel tank.

As the name of the unit would suggest, the operation of the V-Ecosilent is indeed very quiet thanks mainly to its cutting edge design. It has an automatic speed controller for low noise and economic operation. The V-Ecosilent has a 4 stroke petrol engine which produces a power output of 3hp at 4500rpm.

The real attraction of the V-Ecosilent however is its capability to run two rescue tools simultaneously. Due to the operating pressures that this unit runs at, it is now possible to operate two tools without a big reduction in pressure. The advantages of this are too numerous to mention but immediately I thought of a road traffic accident scenario where you have one member of the rescue team using spreaders and then requesting cutters to be used. The cutters can of course be plugged into the second outlet of the V-Ecosilent and the rescue teams have wasted no time in returning to their vehicles to retrieve a second power unit.



Picture courtesy Weber Hydraulik

The output and operating figures of the V-Ecosilent also make for interesting reading. Using just one tool, the operating oil pressure equates to 5.4 litres per minute and with two, the pressure is 2.7 litres per minute. This is a first as other units with simultaneous operations, pressures reduce by more than 50%, not with the V-Ecosilent.

Weber Hydraulik have over 65 years experience in hydraulic applications and have been supplying the world's fire and rescue departments with quality rescue equipment. Founded in 1939 by Emil Weber the company has remained wholly owned by the Weber family. The company employ 1100 staff and its current turnover is in excess of €210 million.

For more information please contact:

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New Disposable High Visibility Masks from Sperian



SPERIAN PROTECTION, European leader in the personal protective equipment market, has launched an innovative new range of high visibility disposable masks. The new products not only guarantee total respiratory protection but also offer increased safety for users, particularly those working in poor visibility conditions, thanks to their fluorescent properties which meet the colour and reflection requirements of British Standard EN471 for high visibility warning clothing.

The new masks are available in two ranges, the Sperian High Visibility 5000 Series and the Sperian High Visibility SuperOne, and were developed following a request from a large mining company in South Africa that was looking for a solution to improve the visibility of its employees working in the mines. Sperian's Research and Development department subsequently designed a fluorescent material which provided high performance visibility during both day and night.

The top-of-the-range High Visibility 5000 Series has, in addition to its reflective qualities, several advantages for the user: a pre-formed nose bridge for individual adjustments, three sizes of mask, a soft "Willtech" seal with absorbent properties and an exclusively designed exhalation valve for greater breathing comfort. Two range models (5221 and 5321) are fitted with adjustable straps so that the mask can be better adjusted to the face and a complete face seal which ensures optimal leak tightness and comfort. The High Visibility 5000 Series also passes the dolomite dust clogging resistance test and provides the user with excellent respiratory comfort while reducing the sensation of tiredness over time.

For users looking for a cost-effective solution, the SuperOne range of masks fits all faces, thanks to their ergonomic design without a nose bridge, and also provide optimal leak tightness as well as an excellent field of vision.

To avoid any allergy risks the new respiratory masks do not contain PVC, latex, or silicone.

The masks have also been tested for visibility by the French Institute for Textiles and Clothing (IFTH). The IFTH carried out comparative tests with a panel of 20 individuals situated firstly 15 metres and then 25 metres away from two people, one wearing a high visibility* mask and the other wearing a standard white mask. Three environments were tested under low and strong light conditions. The results showed that 95% of those questioned believed that the high visibility masks were more visible than the white masks.

Sperian equipment offers: Protection you can trust.

For more information: Tel: +44 (0)1256 693200 Email: uksales@sperianprotection.com

X-plore High Level Respiratory and Eye Protection

Combining both respiratory and eye protection, the DRAEGER X-plore 5500 Full Face Mask is ideal for use in hundreds of applications throughout industry. Featuring a bayonet fitting for fast, simple replacement of particulate as well as gas and vapour filters, it also benefits from a triple seal around the face and an excellent field of vision.

Believed to be unique, the two-point bayonet connector attaches both filters to the mask using the same half-turn technique. The swept back, low-profile position of the filters also ensures that the user's field of vision is free from obstruction, even when several filters are used in combination.

Designed to provide even weight distribution with unrestricted movement, the 5-point head harness enables the mask to be fitted and removed quickly, without tangling hair. For maximum respiratory protection, the double-layer face seal incorporates a triple sealing action to ensure a leak-free, secure seal. Offering a wide, clear field of vision without distortion, the large visor also provides a high level of chemical, thermal and mechanical resistance.

Meeting the requirements of EN136, the X-plore 5500 is universally sized to suit all face sizes and, as a result, can also simplify storage as well as spare parts requirements. Optional accessories include a spectacle kit complete with frame and holder, mask and carrying boxes, a lens cover, anti-fogging gel and cleaning cloths.

X-plore is a registered trademark.

Further information is available from Paul Harvey, Draeger Limited, Ullswater Close Blyth Riverside Business Park, Blyth Northumberland NE24 4RG
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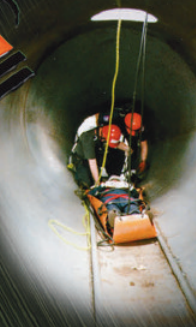


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Pelican™ Products, Inc. Acquires Hardigg® Industries

Acquisition is the Largest in the History of the Protective Case Industry

Deal Bolsters Pelican's Product Line and Expands Service Offerings

The world's leading manufacturer of plastic injection molded protective cases, PELICAN™ PRODUCTS, INC., today announced the acquisition of long-time competitor, Hardigg Industries, the world's largest manufacturer of roto molded protective cases, based in South Deerfield, Massachusetts. The transaction, valued at approximately \$200 million, is believed to be the largest acquisition in the history of the protective case industry. Pelican

Products was supported in the acquisition by the New York and San Francisco based private equity group Behrman Capital.

"Despite the current economic downturn, Pelican Products has continued to grow its position as a global leader in the design and manufacturing of advanced lighting systems and virtually indestructible injection molded cases," said Lyndon Faulkner, president and CEO, Pelican Products, Inc. "The acquisition of

Hardigg is testament to Pelican's commitment in driving growth of the company and its pledge to leading innovation in the industry. I am extremely excited to conclude this acquisition and to put two global organisations together combining their respective strengths."

Collectively the new entity will employ more than 1,500 employees. Pelican Products will operate in 12 countries, have 22 offices globally and maintain six manufacturing locations throughout Europe and North America. It is well capitalised for future growth and will drive to a half billion dollars of revenue over the next few years.

The Hardigg brand name will continue to identify the company's high-end roto molded shipping cases, leveraging the brand recognition of Hardigg.

Hardigg Industries is the world's largest manufacturer of roto molded shipping cases used by the military, consumers, public safety officers, the industrial sector, and other professionals. As the first company to manufacture an airtight, watertight and virtually indestructible protective container, Hardigg has been a leader in the design and manufacturing of roto molded protective transport cases since its founding in 1954 by James S. Hardigg. Hardigg also produces the Storm Case® line of injection molded protective cases.

"The reputation of the Hardigg brand and quality of its products, people and processes make it an ideal partner," added Faulkner. "By bringing together the world's largest roto molded case manufacturer with the world's largest injection molded case manufacturer, the greatest beneficiary is the customer. As a result of our new partnership, Pelican will offer customers an unrivaled product range, all from a single source."

General Peter Pace USMC (Ret.), chairman of Pelican, commented, "The manufacturing strengths of Pelican and Hardigg create a strong combined selling model and market synergy. The acquisition enables us to enhance offerings to our core customers, including the military, while continuing to expand our footprint with other important customer segments."

Jamie Hardigg, chairman of Hardigg Industries, commented, "By joining the Pelican family we can offer more opportunities to employees, expand our product line and enhance our global reputation. We're excited that the combination of our companies creates a global industry leader well poised for continued growth."

Jamie Hardigg plans to cease his day-to-day management responsibilities, but will serve as a member of the Board of Directors for Pelican Products. John Padian will continue to manage the Pelican organisation as COO of Pelican Products and Bill Hamer will continue as COO of Hardigg Industries. Both will report to Lyndon Faulkner, president and CEO of the Pelican Corporation.

For more information please contact:
Email: marketing@peli.com
Website: www.peli.com

New Holmatro cutter CU 4055 C NCT™ II

Stronger with wider blade opening and deeper reach

Over the past few years the A-, B- and C-pillars in modern cars have become substantially wider, deeper and thus stronger. These developments obviously come to increase occupant safety. At the same time however they prove difficult barriers for rescuers after a collision during victim extrication efforts. To surround and cut these expanding and increasingly complex vehicle constructions HOLMATRO has developed a brand new cutter: the CU 4055 C NCT™ II. This strongest Holmatro cutter so far combines a wide blade opening (202 mm) and deeper reach with a significant cutting force of 1018 kN/103.8 t.

New Car Technology

The CU 4055 C NCT™ II belongs to Holmatro's second generation of New Car Technology cutters. Its characteristic U-shaped blades are specifically designed to cut the advanced constructions and hard materials found in modern vehicles. Moreover, they do this with far more



efficiency and at a much lower working pressure than possible with regular 'General Purpose' type blades. Holmatro's NCT™ blades pull the material into the cutting recess, where the cutting force is at its maximum. This results in a more controlled and smoother cut.

4000-series

Being part of Holmatro's 4000-series this new cutter is equipped with many innovative features such as i-Bolt Technology (flat central bolt construction for better access, and superior cutting performance), single hose CORE™ Technology and LED lighting in the carrying handle.

For more information:
Website: www.holmatro.com/rescue



PBI performance products announces major capacity expansion, advanced polymer applications

PBI Performance Products, Inc. announced at its recent 25th Anniversary Open House that over the next 5 years it will invest 15 million dollars at its Rock Hill, SC facility to support the growing demand for its top-rated fire resistant fibers and will develop advanced polymer applications using its Celazole®PBI polymer.

This will be the first major expansion since the original facility was started in 1983 and represents a 50% capacity increase that includes new state-of-the-art fiber spinning technology and newly developed processes for adapting Celazole®PBI polymers to applications in separations, coatings and films. This investment is expected to create 19 new jobs, with at least 10 new jobs in the first year. The engineering design phase will take approximately 15 months with ground-breaking expected in 2010.

"The constantly growing number of applications where polybenzimidazole fibers and polymers have proven their value necessitates we invest in the future with expanded capacity and new process technology that will precede and surpass the expectations of the market," explains Grant Reeves, President of PBI Performance Products. "We will be proactive in this endeavor by continuing to maintain excess capacity for large programs, with direct support for research and development, global marketing to publicize PBI's unmatched physical properties and collaboration with the world's most respected designers and engineers. In its various forms and in sufficient quantities to support any program, PBI Performance Products will always be ready to supply PBI fibers and polymers . . . today, tomorrow and in the future."

PBI Performance Products is the world's only producer of polybenzimidazole (PBI) fiber and polymer. PBI fiber is the most inherently flame-resistant and thermally stable fiber in the world, and PBI polymer is the highest performance engineering thermoplastic. PBI fiber will not burn in air, does not melt or drip, and will retain its strength and flexibility after exposure to flame. PBI fibers form the backbone of various fabric blends, providing flame-resistance and thermal protection with the highest level of comfort, durability, and protection. PBI Performance Products works with end-users worldwide to develop and support the use of PBI in a wide spectrum of markets, including: protective clothing for fire

service, military and industrial workers; semiconductor and electronics; and aerospace, automotive, and various other high temperature applications.

"We were pleased with the local and state support that provided the incentives to keep this strategic investment in Rock Hill", commented Scott Groshans, VP of Operations. "We are proud of our accomplishments over the past 25 years that inspire us to take our plant to a new level of performance."

"PBI Performance Products is a world leader in the advanced materials and fabrics industry, with product applications ranging from protective apparel to automotive brakes. The company's decision to expand its facility in Rock Hill is a strong testament that our state's business-friendly climate and quality workforce are working to grow existing businesses and attract new investment to South Carolina. Thanks to the team effort of state and local officials, York County will benefit from this investment," said Joe Taylor, Secretary of Commerce.

PBI Performance Products is headquartered in Charlotte, North Carolina and operates a dedicated manufacturing facility located in Rock Hill, South Carolina and global sales offices in England, Germany, Spain and Hong Kong. Reeves further explained that, "Through people, products and perseverance, PBI's goal is to provide insight into the most demanding applications. Our engineering, sales and technical support together with a family of polymers and fibers offer the very best solutions to a variety of high tech applications."

PBI Performance Products, Inc. is a wholly owned business of The InterTech Group, Inc.®, located in North Charleston, SC. The InterTech Group operates a diverse, global group of companies specializing in custom engineered solutions. InterTech products can be found in a wide variety of industries and applications, including aerospace, power generation, medical, hygiene, sporting goods, home furnishings and construction materials, among many others. **IFF**

Further information please contact:

PBI Performance Products Inc.

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(843) 202-4349

www.PBIproducts.com

London Fire Brigade specifies Bristol Uniforms' Urban Search & Rescue PPE

In a move designed to boost London Fire Brigade's (LFB) specialist response capabilities, the Capital's fire and rescue service has procured 660 sets of urban search and rescue (USAR) personal protective clothing (PPE) from Bristol Uniforms, one of the world's leading designers and manufacturers of protective clothing for the emergency services.

With an increasing number of fire and rescue authorities (FRAs) recognising the operational benefits of having specialised protective clothing for different hazards, USAR PPE is designed to protect front line firefighters in search missions following, for example, structural collapse of a building. Working in difficult and dangerous situations requires a high level of manoeuvrability with maximum physical protection. This is where Bristol's design experience has allowed it to offer an ideal combination of features which has led to the procurement of 660 sets of jackets and trousers incorporating an outer-shell of Kermel® high visibility orange fabric. The contract for the supply of the PPE and its managed care was concluded in the late spring and the garments delivered for use by LFB's 330 strong USAR team in early June. Every firefighter will have 2 sets each with a reserve stock of spares.

The contract, in the form of a framework agreement, also calls for the provision of a managed care package under which Bristol will regularly collect used garments for inspection, washing and repair as well as decontamination, if required. Using a computerised recording and tracking system each item of PPE is identified to its individual wearer to ensure that items are always returned to the correct location and individual firefighter for whom the garments were carefully sized prior to manufacture and issue. Using a bar code and optical scanning system to track each garment's service history builds a complete record providing valuable inventory management information for the FRA. Special scanners were issued to LFB prior to the USAR kit being issued to allow every garment to be recorded with its technical details alongside those of its allocated wearer. This will help speed up the computerised logging of all the PPE when it is first returned for routine servicing at Bristol Care™.

Bristol's logistics flexibility affords the option of centralised collection and delivery or uplifts from individual fire stations. Initially all 660 sets were delivered to central stores in Croydon but, with 11 locations around Greater London, alternative scenarios will be tested before the long term best available solution is chosen.

London Fire Brigade's Richard Binder, Group



Manager, Urban Search and Rescue Management Team, said: "The introduction of specialist USAR equipment and training has proven to be an immensely valuable addition to the Brigade's capabilities. Our USAR crews enter into difficult and dangerous rescues which often last several hours, and it is important that our crews have the right PPE that can stand up to the rigorous and demanding nature of urban search and rescue."

"Following comprehensive trials and testing by the Brigade, the high visibility orange suits, along with a range of other protective items, were identified as providing the highest level of comfort and protection for the specialised work carried out by the crews."

Bristol's UK Sales Manager, Philip Tasker, added, "This is a major milestone for us and represents an important development in the UK's fire service's move towards adopting a more specialist approach to PPE. In an environment in which the demands placed on the fire service are becoming increasingly complex, the need to provide personal protection for firefighters appropriate to the hazards faced in different operational situations demands a more tailored approach – one which is being seen reflected in the growing adoption of specialist technical rescue PPE by both the police and ambulance services. We are pleased to have been awarded the opportunity to supply London Fire Brigade's USAR PPE requirements as well as to look after the garments throughout their service lives through the provision of a managed care service".

IFF

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Confined space rescue

By Phil Saxton

Sales Manager,
Draeger Safety UK
Limited

Asphyxiation, entrapment, physical injury, engulfment and poisoning – these are just some of the hazards that are faced by firefighters confronted with a confined space rescue operation.

Often containing a lethal concoction of substances, a confined space can be defined as any chamber, tank, vat, pit, pipe, flue, tunnel, excavation, digester, pumping well or station. Similarly, it can be a sewer, shaft, underground utility duct, boiler, hopper, silo, borehole, steam condenser, culvert, manhole, septic tank, cellar or bunker.

In fact, any area can become a confined space under certain conditions. For instance, an open ditch or open-topped vault becomes a confined space if air circulation inside is poor and a gas that is heavier than air accumulates at the bottom. Equally, a structure or irregular shape becomes confined if pockets of gas or vapour accumulate where air circulation is restricted.

Understanding the hazards

Wherever they might be, confined spaces share a wide variety of potential hazards. Access is usually limited, they are often poorly ventilated and not only can they contain gases and other harmful substances, but escape of rescue from them can be extremely difficult.

The seriousness of the hazard is dependent upon a number of factors such as the location itself and the nature of any work carried out at that location. The dangers can be dramatically increased, however, if a combination of hazards exists.

Toxic gases or vapours, for instance, can poison or suffocate, whilst any work in progress, such as cleaning, welding and painting can produce dangerous fumes. It is also possible that toxic gases and vapours created during previous work might still be present upon re-entry, even at a much later date.

A build up of flammable gases or vapours can also burn or explode. Sometimes formed by scale or residue inside the confined space, or by cleaning methods or decomposition of organic materials, etc., these substances can ignite or explode upon exposure to an open flame or spark. In addition, some applications, such as oxy-propane cutting, may create an excess of oxygen which would increase the danger of spontaneous combustion.

An atmosphere containing less than 21 per cent



oxygen is known as being oxygen deficient and can be life-threatening. Caused by oxidation, rusting, fire, growth of bacteria, or displacement of the oxygen by another gas, oxygen deficiency will initially cause drowsiness. It can also lead to euphoria, a “happy” state which usually prevents the “victim” from realising the dangers before it is too late.

Discarded syringes and bacterial infections can be a major problem in sewers and waterways. Leptospirosis, for instance, is a reportable disease that is usually contracted following exposure to rat urine and disease-carrying rodents. Infection results from the microbe entering the body through open cuts and scratches or through the lining of the

eye, mouth or throat and can be prevented by wearing appropriate protective clothing.

Engulfment is another major concern. Anyone sinking into or becoming covered by coal, sawdust, flour, grain or sugar can suffocate in a matter of minutes.

Safety through knowledge

The most frequent causes of serious accidents are that people do not always recognise a confined space hazard when they see one. Firefighters will often be involved in a rescue operation where people have relied on their senses and have not realised that it is impossible to see, hear, touch, taste or smell most dangerous atmospheres.

Hazards and their recognition properties

Hazard	Effect	Density	Smell	Sight
Carbon dioxide	Asphyxiating	Heavier than air	None	Invisible
Methane	Flammable	Lighter than air	None	Invisible
Hydrogen Sulphide	Flammable/toxic	Heavier	Rotten eggs	Invisible
Chlorine	Toxic	Heavier	Yes	If ≥ 10 ppm
Carbon Monoxide	Toxic	Slightly lighter	None	Invisible
Ammonia	Flammable/toxic	Lighter	Yes	Invisible
Propane	Flammable/asphyxiating	Heavier	Yes	Invisible
Butane	Flammable/asphyxiating	Heavier	Yes	Invisible
Acetylene	Flammable/asphyxiating	Lighter	Yes	Invisible

CONFINED SPACE RESCUE

Whilst some gases and materials have distinctive smells, others have no odour whatsoever. On the other hand, hydrogen sulphide can, in certain concentrations, paralyse the olfactory nerves and, as a result, shut down an immediate line of defence; the sense of smell.

There are two basic rules when approaching a confined space: always check the atmosphere prior to entry and do not enter unless an observer is present. For absolute safety, everyone should always assume that hazards are present until they know otherwise.

Not only is it essential that the atmosphere is tested before entering the confined area, but monitoring should continue throughout the rescue operation. The confined space should be isolated and all points of access secured.

Armed with portable gas detection instrument, appropriate protective clothing and respiratory protection, everyone entering a confined space should be supported by an observer who remains outside at all times. Likewise, the supporter should be equipped with harness, lifeline and protective equipment, ready to react in case of emergency.

Training

Safe, effective training can help to overcome many of the fears and concerns associated with confined space applications. Purpose built training centres can create all kinds of simulated training scenarios using manholes, crawl galleries, water, smoke and dimly lit conditions.

Offering a series of confined space training courses at its purpose-built European training centre in Blyth, Draeger covers everything from identifying a confined space and its hazards through to examination, assessment and treatment of casualties, and how to carry out a rescue. It also provides training on the selection, use and care of respiratory protective equipment, as well as the selection and use of gas detection equipment.



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Effecting a rescue

The recognition of an injury is obviously vital, as is the ability to recognise the different causes and levels of unconsciousness and other medical conditions including asphyxia. In addition to recovery positions, and correct examination and immobilisation procedures, the theory and practicalities of injuries to bones and supporting tissues should be understood as well as the control of internal and external bleeding and head and facial injuries.

An effective rescue is often dependent on the rescuers understanding of the following issues:

- The importance of not taking risks with either one's own life or the life of the casualty.
- Establishing the safety of the rescuer (air monitoring, PPE, etc)
- The treatment of injuries to muscles and joints
- The treatment of fractures
- Head and spinal injuries: immobilisation and support
- The need for continuous monitoring of the patient during the rescue
- The nature of oxygen
- CPR techniques
- The use of the Glasgow Coma Scale
- Rescue equipment (selection use and care)
- Carrying out a rescue – different rescue methods and practical exercises
- Airway management

By using full weight and CPR dummies as well

as stretchers, spinal boards, splints and other rescue equipment, the training centre can bring a real sense of urgency to a simulated yet still very realistic emergency.

However, unless rescuers have carried out a thorough risk assessment, they run the risk of becoming victims too.

Training on the identification of known and unknown gas atmospheres, and the use, maintenance and care of different types of gas detection equipment is essential. Single gas detectors, as the name implies, can be used to detect a known gas, whilst multiple gas detectors will look for several gases at once. The choice will obviously depend on how many factors are known at the time and point of entry.

Protecting the rescuer

The very nature of confined space rescue can mean problems with oxygen and potentially explosive atmospheres. As small as a mobile phone, for instance, the Draeger X-am 2000 is one of a new generation of gas detectors which have been specially designed for personal monitoring use where explosive gases and a lack or surplus of oxygen may exist. Offering reliable measurement of combustible gases and vapours as well as oxygen, carbon monoxide and hydrogen sulphide, this 1 to 4 gas detector is the perfect partner in any gas

sensitive area. For improved safety when facing unknown hazards, the catalytic Ex sensor, calibrated to methane, responds quickly to explosive gases. Offering a high level of sensitivity to combustible organic vapours it also ensures dependable warnings in the event of explosive hazards.

Once the atmosphere has been assessed, the rescuer can also then select the most appropriate form of personal protective equipment such as gloves, boots, helmets and, of course, respiratory protection. A wide variety of respiratory protective equipment exists from short duration breathing apparatus (BA) sets through to full BA. As well as the nature and concentration of the hazard, making the right selection will depend on a number of other factors such as any access or movement restrictions, the likely duration of the rescue and whether the atmosphere is, or could become, immediately dangerous to life and health (IDLH).

For instance, legislation makes it clear that escape sets are not breathing apparatus substitutes and cannot be worn for entry purposes – they should only be donned in order to make an escape. Not to be confused with escape sets, short duration BA such as the Draeger Personal Airlines System (PAS) Colt can be worn to enter an incident where it is known that a hazard exists. These compact lifesavers can be worn on the hip and incorporate an innovative “drop down” feature which enables the cylinder to be unclipped from the waistbelt. Providing additional manoeuvring

capabilities where space is tight, it also benefits from a smaller, lightweight cylinder and a sophisticated harness.

If there is any doubt about how long the rescuer may need to remain within the confined space, then full BA, complete with electronic monitoring and communications systems, needs to be considered. Sets such as the new Draeger PSS 7000 feature lightweight carbon composite backplates and cylinders, and have been specifically designed to maximise comfort and minimise both stress and fatigue.

Forming part of a revolutionary, complete system solution it boasts advanced technology as well as a modular design. Enabling the set to be easily and quickly configured to suit different operational requirements, it also provides seamless integration with facemasks, head protection and communications equipment and telemetry systems. Extended duration sets that can provide up to four hours of breathing air are also available when performing rescue operations in tunnels or underground areas.

A successful rescue operation is reliant on the



use of the right equipment, the adoption of the right techniques and the ability of the rescuer to work as quickly and as safely as possible. Training will help to ensure that the right equipment and techniques are used, but that is only part of the equation. The use of the best respiratory protection and gas detection equipment will allow rescue teams to concentrate on their surroundings and the difficult task at hand, safe in the knowledge that they are protected from harm. **IFF**

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The SP700 may be used to power all rescue tools currently on the market (cutters, spreaders, rams, etc) working at 350, 630 and 720 bar (5100, 9200, 10500 psi).

The battery has a run down time of over 30 minutes, and is easily replaced with a fresh power cell. The SP700 is ideally suited to operation in remote areas, and for RIT, forcible entry, or anywhere combustion exhaust poses a hazard. Its quiet operation allows for a more controlled rescue scene.

The VP700 backpack power unit is identical in weight and function to the SP700. The sturdy outer case allows for operations in the most unforgiving environments, making it perfectly suited to confined space, and other high hazard areas. The straps provided are robust enough to allow the unit to be lowered by helicopter into an emergency scene. Watertight until 2mt. depth.



VP700



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How well do you know your thermal imaging camera?

By Paul Spooner

Product Manager,
Argus Thermal Imaging
from e2v

Thermal imaging cameras (TICs) have been used in fire fighting environments for nearly thirty years; the technology is well known and extensively used within the industry.

The history is well documented, but what are modern thermal imaging cameras currently capable of, and what developments lay ahead? Budgets for fire and rescue equipment can be limited, so deciding where funds are allocated is a key decision. Do you know what thermal imaging can do for you? Are TICs viewed as luxury items or are their life saving credentials, and their role within fire prevention recognised at your station?

Handheld thermal imaging technology has come a long way since its development nearly thirty years ago. Picture quality has vastly improved and to are now far more reliable than before, a good quality camera should be expected to last a minimum of five years, this in turn has reduced the cost of ownership. Many manufacturers now offer an assortment of models suited to different budget requirements, they also offer a variety of warranty packages, which can include a 2-year standard warranty for peace of mind. Technology today offers the end-user a host of features designed to make their life in a fire safer and easier – as well as effectively assisting them in doing the job at hand!

Today cameras offer two types of temperature detection to aid fire fighters in determining the heat of their surroundings – ambient temperature measurement which gives fire fighters rapid identification of the areas temperature within the fire environment, area. Notification of these temperatures can indicate dangerous situations and the fire

fighter can make a decision whether to evacuate the premises or continue the search. Spot temperature measurement enables fire fighters to pinpoint the exact heat of objects or obstacles. This saves time and extinguishant by allowing fire fighters to focus on the hottest part. This option enables fast and effective location of the seat of a fire or detecting hot spots in cavity walls or behind doors – indicating potential danger in another room. In addition, this feature can be useful for determining the temperature within enclosed capsules or spaces, even measuring the temperature of gas cylinders. Temperature sensitivity modes are now used to expand the dynamic temperature range of the thermal imaging cameras, some cameras now having 3 modes to further increases the viewable temperature range up to 1000°C. The image on a camera LCD screen can move seamlessly from a cooler scene to a very high temperature scene without the loss of detail “whiteout”.

Improved picture quality today not only allows fire fighters to view images in far more detail than was possible with older cameras but latest offerings allow full colour options. Various screen colour settings enable fire fighters to switch between monochrome all the way to full colour. This makes detecting changes in heat and finding the hottest part of an image on the screen easier, faster and more reliable thus saving vital seconds in scene assessment.



A person needing rescue in water gives off more thermal radiation than his or her surroundings therefore presents a distinctive shape on a thermal camera's LCD screen. Certain colour palettes give a better image than others do. It is better to decide which colour palette provides the clearest image before fire fighters use the camera, it is not recommended to change palettes during use, to do so will steal valuable time from the search.

Coupled with improved image quality comes image capture. This feature allows fire fighters using the thermal imaging camera, to take pictures at the scene of a fire. This is a significant aid in mapping the layout of the scene, taking images while assessing the scene will provide a valuable insight to other fire fighters before they enter a building, helping them avoid obstacles, locate doorways, and stairs hidden by the thick smoke.

Forensic investigation is another use for modern thermal cameras, they can capture evidence in the fire ground before it is destroyed by the blaze and can help deliver vital clues as to the source of fires and provide data for analysis and investigation. Pictures taken can be downloaded from the camera to a PC or Laptop and subsequently inserted into an incident report. This feature can also assist in training fire fighters.

Thermal cameras can be very helpful at a scene of a day or night time road traffic accident, they assist fire fighters to locate victims who have been ejected from the vehicle, or who have become disoriented and walked away from the scene. If used early at a scene, thermal imaging can also be used to determine the number of passengers in the car or truck, a quick sweep for the interior of the vehicle can detect heat sources on the seating left by the occupier, this application helps fire fighters to determine if all occupants have been accounted for. Additionally, skid mark, vehicle parts or disturbance of roadside can be identified, locating vehicles that have left the road.

Remote wireless video (telemetry) on thermal cameras allows remote viewing of the fire scene. Station commanders can monitor what is happening away from the scene and, if necessary, send in back-up to help deal with an incident. This option is also useful for training purposes. In addition, telemetry allows fire fighters to record footage of what is happening in the blaze/training exercise for later analysis and effective de-briefing of personnel.

Finally, remote control set-up and user personalisation allows fire fighters the flexibility to enter their personal settings in terms of screen colour, white or black hot, contrast, brightness etc on the camera before entering into the fire ground. A station or brigade logo can also be uploaded onto a splash screen on cameras to improve asset tracking. All settings are defined before the fire fighter enters the blaze.

Thermal cameras today are so versatile that using them simply for fire and casualty detection is only half the story. There are many different applications aiding not just civilian fire personnel but also marine and airport fire brigades, not only in search and rescue but in fire detection as well.

Take the marine market for instance. Incidents can start in various places around vessels but often in engine rooms or electrical systems. Overheated motors can develop into blazing infernos. Using a thermal imaging camera as an engineering tool allows gearboxes, motors and bearings to be regularly monitored facilitating the rapid identification and elimination of hotspots. Pipe work and distribution panels can be similarly investigated for faults. Condition monitoring and faultfinding using thermal cameras in this way increases safety standards on ships and helps prevent fires starting. Coupled with this, the image capture facility on modern thermal cameras enables routine controlled inspection of vessel engine rooms and the ability to download the images to a PC or Laptop helps to develop a portfolio of thorough records for external auditing and monitoring equipment performance. This leads to cost reduction in the area of engine and equipment management and safety, in compliance with marine regulations. Once a thermal imaging camera is on board a vessel, if a fire does start, using the camera for casualty location is also of paramount importance as passengers can become disoriented by smoke logged corridors and become unable to find their way to an area of safety. Thus, what was once considered an unnecessary investment has been transformed into a multi-functional tool that can become essential to the safe operation of the vessel.

Similarly, thermal imaging cameras are widely used in airports for aviation fire fighting, mounted on the outside of a fire appliance, the camera allows the driver to take his vehicle through thick smoke which means that the team can lay down foam faster and more accurately. With aircraft incidents involving hot brakes, aircraft wheel brake assemblies can be rapidly inspected to give an accurate indication of their temperature. In airport terminals, surveys of escalator motors, distribution panels and air conditioning ducting can be rapidly undertaken, as part of fire prevention schemes.

Finally, thermal imaging cameras have become widely used for tunnel fire fighting. In France and Italy, fire trucks utilising two driver cabins to eliminate having to turn trucks in tight tunnel environments have used thermal imaging cameras mounted at either end of the truck to help them navigate through the thickest smoke in an emergency situation.

Currently, due to increased competition in the market and technological advances in cameras, users are substantially better catered for than they ever were in the past. The most important aspects in making the right choice of camera, surrounds not only the initial cost of ownership, ergonomics and functionality specific to applications but the on-costs associated with day to day maintenance, consumables (such as batteries), reliability (in terms of the technology used) along with the warranty offered.

It has become obvious that the applications for thermal imaging cameras are extending and that the functionality offered on latest generation cameras facilitates this. Features and options offered on today's cameras, in addition to increased reliability and technological advances, make thermal imaging not only a wise choice but also a sound investment.



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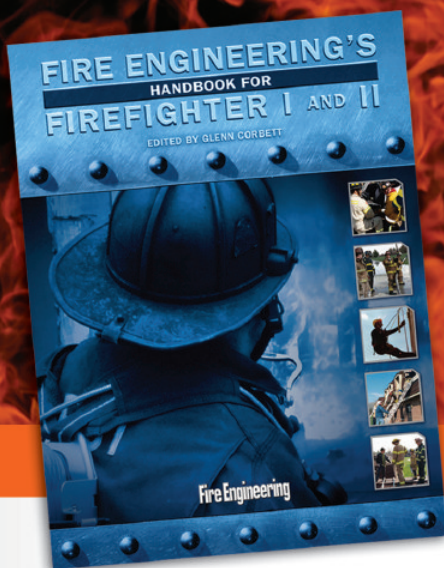
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The Threat is Still Real

By Jeffery
W Petersen

Is there a chance of Suicide Bombings in the United States? Is your Department ready to respond to such a catastrophic event?

Suicide Bombings are one of the most effective ways to successfully penetrate a target and create injuries and havoc. Everyone has seen the scenes of chaos and destruction caused by bombings on buses and in cafés. What type of impact would a similar event cause in the United States – in a movie theater, or mall?

A suicide bomber or “homicide bomber,” as coined by President George W. Bush, is an individual that carries an IED (Improvised Explosive Device) on their person to detonate in a location with the intention of taking the lives of bystanders, as well as their own. Since 2000, there have been over 1300 Israelis killed in bombings and shootings, and the majority of these fatalities are caused by Suicide/Homicide Bombers. What is the possibility of this occurring in the United States?

On Oct. 15, 2003, a bomb was detonated against a U.S. Embassy convoy in the Gaza Strip, in which three American security guards were murdered, and one was wounded. On Nov. 8, a car bomb disguised as a police vehicle killed 17 and injured over 100 in Riyadh, Saudi Arabia. That attack was initiated with an actual armed assault to gain entry into the compound. There have been

There is a tremendous amount of information on profiling, pre-incident indicators, interdiction, response, and other important issues that cannot be covered in this article due to time and size constraints. This article will focus primarily on the “Fire/EMS Suicide Bombing Response.”

Middle Eastern experiences have shown:

- Men, women and older children have been suicide bombers.
- Targets have included buses, clubs, restaurants, police checkpoints and other public locations, where there are large groups of people – “Soft targets.”
- Devices in the Middle East have included belts, vests, jackets, backpacks, suitcases and even a guitar case. The device usually consists of ten to 30 pounds of explosive that can be easily hidden in clothing or other packaging systems.
- A few bombers have been killed or interdicted by police/military forces; some have been identified by citizens, but most use the element of surprise, where the detonation is the first and only indication of an attack.
- Bombers will add nails, bolts, ball bearings and other devices to the explosives.

At this time, the FBI possesses no information indicating specific plans to conduct suicide bombings against the United States.

dozens of Americans killed by roadside and suicide bombs in Iraq in the past 12 months. There have been several suicide bombers interdicted in Afghanistan and Iraq, as they were in the final stages of an attack. Recent intelligence has stated that Al Qaeda has been actively recruiting potential suicide bombers. It is a very simple and inexpensive process to make a suicide belt or bomb. Is this the new threat we are facing in the United States?

FBI Director Robert Mueller stated, “Suicide bombers are inevitable in the United States;” and former CIA Counter Terrorism Chief Vince Cannistraro said, “There is no 100 percent defense against suicide bombers.” At this time, the FBI possesses no information indicating specific plans to conduct suicide bombings against the United States. However, due to the recent increase of homicide bombings in the Middle East, there has been a concern that terrorist organizations or lone Islamic extremists may target American interests at home or abroad. For instance, in 1997, law enforcement officials arrested two individuals for plotting a suicide bombing attack aimed at Orthodox Jews on a Brooklyn, NY subway station.

- Hazardous chemicals, pesticides and anti-coagulants have also been added to the explosive devices.
 - Bombers have also been infected with diseases such as HIV and Hepatitis; thus, exposing the victims.
 - Ambulances have been used to transport bombers and devices during events.
- DO NOT ASSUME THIS WOULD BE THE METHOD OF ATTACK IN THE UNITED STATES.

Pre-detonation response

Pre-detonation response will take place before there is an explosion. If there is a report of a possible suicide bomber, very little time will be available for police intervention if the suspect is indeed, a homicide bomber – especially when they are possibly moving towards their target.

- Call-takers/dispatchers must get as much information as possible. Every effort should be made to keep the callers on the line during the response. Extreme specificity should be obtained as to the direct knowledge of the caller and as to why the person is suspected of being a possible bomber.

- All responders (Fire, EMS, Law Enforcement) should approach the location without lights and sirens. This affords the best chance of not alerting the suspect, and allows officers to choose the best approach to the suspect.
- Vehicles should be parked out of suspect's line-of-sight.
- Law Enforcement officers will need to approach the subject on-foot, thus allowing the maximum opportunity to maintain a safe distance between themselves and the suspect.
- Unified Command Post and Fire/EMS staging areas should be established well outside of the hazard zone.
- Establish a Task Force or Strike Force to respond out of staging area, if time and circumstances allow.
- Trained tactical medics can be assigned to support law enforcement operations.
- Standard guidelines against the use of cell phones and radios are not applicable. There will be an overriding need for a rapid, coordinated response.
- Responders should be prepared to establish flexible evacuation and containment areas. Rapid communications will be vital.
- If there is an explosion, there must be a controlled response into the hazard area.
- If the suspect is neutralized and there is no explosion, do not render aid to the suspect. Suspect may only be injured and could still detonate the device. Bomb squad or robot must do first approach of a bomber or suspected bomber. Please follow local guidelines and procedures. This article is for informational purposes only.
- Biohazard issues will need to be addressed very rapidly, as these scenes can have multiple traumatic injuries in one small location. Decon may be an option.
- Do NOT approach the suspect or suspect's remains, regardless of their condition. There may be undetonated or partially detonated explosives or secondary devices present. Bomb squad or robot must do first approach of a bomber or suspected bomber no matter how long the wait.
- Be aware of the possibility of secondary devices and snipers/active shooters in the area. This type of event has occurred in the Middle East and has targeted responders.
- If there is a vehicle or structural fire involved, conduct a rapid knockdown while considering evidence.
- Establish as large a crime scene perimeter as possible.
- Leave emergency vehicles in place that are/were inside the blast/crime scene, until the bomb squad can determine they are safe to move and moving them will not destroy key evidence.
- Plan on intensive media response.
- Make immediate notifications of local, state and federal resources.
- Plan on an extensive, multi-day crime scene investigation. (In Israel, scenes are cleared within four to six hours.)
- Scene will be a very fluid, dynamic situation. Responders have been killed at these types of events.

A suicide bomber event has the overwhelming potential for a large number of victims and fatalities.

Post-detonation response

Post-detonation response will take place after an explosion has occurred. A suicide bomber event has the overwhelming potential for a large number of victims and fatalities.

- First responders must proceed with extreme caution for their own safety, as well as the safety of the public.
- Call-takers/dispatchers must get as much information as possible.
- Standard guidelines against the use of cell phones and radios are not applicable. There will be an overriding need for a rapid, coordinated response.
- Rapidly establish Unified Command Post and staging areas outside of hazard area; start building Incident Management System.
- Fire and EMS supervisors must conduct a rapid scene size-up or "windshield survey."
- Establish a Task Force or Strike Force to respond, if time and circumstances allow for a more controlled response.
- Quickly extract victims away from the area and render aid in a secure location. START (Simple Triage and Rapid Transport) would be an excellent system to use. Triage must be conducted outside the hazard area.
- Trained, tactical medics would be a very valuable asset to operate in the hazard area while conducting triage and extractions.
- Will need to use local Mass Casualty/Mass Fatality procedures.
- Will have numerous types of injuries – from traumatic injuries, blast pressure or internal injuries to burns and shrapnel.

Please follow local guidelines and procedures. This article is for informational purposes only.

Recognizing the growing threat of homicide/suicide bombers in the United States, the Department of Homeland Security (DHS) is working on a new, week-long "Countering and Responding to the Suicide Bomber Threat" course. This is being developed in New Mexico.

New Mexico Tech (NMT), located in Socorro, NM, is a member of the National Domestic Preparedness Consortium. Currently, it offers an "Incident Response to Terrorist Bombings" (IRTB) course, which is funded through the Department of Homeland Security. NMT is in the process of developing the "Countering and Responding to the Suicide Terrorism" course. The primary purpose of this new course is to provide participants with the knowledge and skills necessary to prevent, interdict, mitigate and/or respond to a suicide-bombing incident. This course will provide participants with the ability to conduct pre-attack analysis and planning; collect information and collate the information into actionable intelligence; implement countermeasures to prevent/mitigate the effects of a suicide bombing; conduct interdiction operations prior to a suicide bombing incident; implement a graded approach response in the event a suicide bombing is imminent; and respond in a safe and effective manner after a suicide bombing has occurred.

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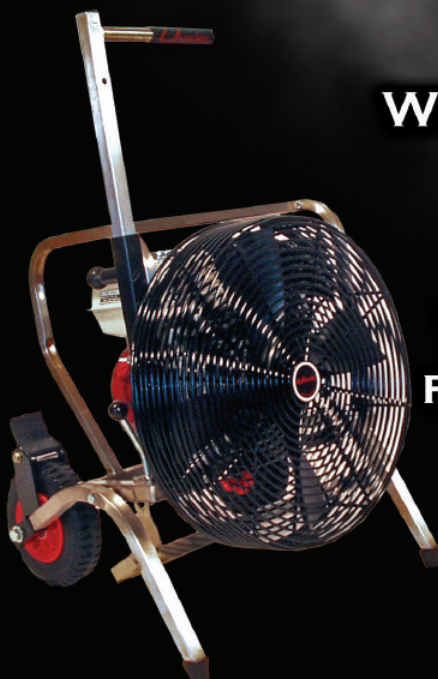
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*Nightscan Light Tower
Product Line.
Pic courtesy of
Towermast, a
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The Importance of Large Area Scene Lighting

By Angie Lamielle

Marketing
Communications
Specialist,
Will-Burt Company

Safety is always a top priority for emergency services personnel. When crews are called to a scene during night time hours, safety becomes a more difficult issue to overcome due to a lack of visibility. To do a job safely at night, the best scene lighting possible is critical.

Telescoping light towers are necessary for illuminating the scene during night rescue, command and control and disaster operations. Emergency services personnel have two options available to them to increase visibility at the scene: vehicle-mounted light towers and portable light towers.

Vehicle-mounted light towers

Telescoping light towers are the optimal way to meet the needs of night time operations, allowing crews to benefit from full scene coverage. Vehicle-mounted light towers are either pneumatic or manually operated. Manual operation requires the operator to “push-up” the tower and manually adjust the direction of the light. Pneumatic telescoping light towers come standard with hand-held remote controls. This allows for quick, precise operation, giving the operator more time to attend to other important functions at the emergency scene.

Mounted to a fire rescue truck, mobile command center or other emergency services vehicle, a critical item to be determined before purchase is how and where the light tower will be mounted. A light tower can be mounted inside the vehicle, outside the vehicle or on the vehicle roof. Where the tower is mounted largely depends on the size of the vehicle and what other accessories are on the vehicle.

Another important consideration when purchasing a pneumatic telescoping light tower is the size

of generator that the vehicle is equipped with. The main concern when purchasing a generator is to ensure the vehicle has enough power to run the lights efficiently.

With varying terrain and operational needs, it is also important to specify the height of the telescoping system. Systems can be installed that are upwards of 12 meters.

Internal mounting

An inside mounting is perfect for a mobile command center or large rescue vehicle. The internal mounting nests the retracted mast inside the vehicle with the light package nested on the roof. The internal mounting provides maximum stability for a vertical light tower with full extension up to 12 meters. Standard kits are available with the light tower itself to assist in mounting internally. If extra space is a problem in the vehicle, there are options available for external mounting as well as roof-mounted configurations.

External mounting

The external mounting works well when maximum extension is necessary but there is not space on the inside the emergency vehicle or on the vehicle's roof. External mountings can be on the rear or side of the apparatus or command center. Many emergency vehicle manufacturers build custom covers that enclose the externally mounted light tower for protection and appearance.

Nightscan Roof-Mounted Light Tower. Pic courtesy of Towermast, a Will-Burt Company



Roof mounting

Roof-mounted light towers save compartment space inside the emergency vehicle. A roof-mounted light tower is mounted on the roof of the cab or within compartment on the truck body. This allows the light tower to stay at or below the roofline of the vehicle when retracted. The consideration when specifying a roof-mounted tower is to ensure there is enough roof space on the apparatus. The roof compartment should be specified large enough to accommodate the light tower required.

Important options for a vehicle-mounted light tower

Lights

Critical when specifying a light tower, is how much light is necessary. There are many companies that offer lighting packages specifically designed for use in the emergency services field. With many options for lighting packages including quartz halogen, metal halide and H.I.D., a custom system can be configured for the illumination necessary to function properly at night. Light towers can have up to 9000 watts of AC lighting or up to 600 watts of DC lighting.

Generators

All light towers need a source of power. This electrical source can come from different places. If tower's lights are DC (Direct Current) they get power from the vehicles electrical system or primarily the alternator.

Larger wattage lights need AC (Alternating Current) source that is provided by a generator, but generators need power as well. The most common generator power comes from the vehicles engine in the way of the Power Take Off (PTO). Some use a direct shaft PTO that spins the generator directly from the drive train. Others use the PTO to drive a hydraulic pump that, in turn, drives the generator.

Lastly, you can have a generator that is powered by a standalone engine. This allows the vehicles to be turned off and the generator to run independent of the vehicle.

Remote controls

A hand-held remote control attached by a coiled cord is typically standard with the purchase of the light tower. Because pneumatic light towers are operated by a remote control, this allows the operator to attend to other important functions at the emergency scene. It can be very time consuming to manually raise the light tower and adjust the lights. A remote control allows the operator to quickly control all functions of the light tower with the

simple press of a button to properly position the lights to provide optimal illumination.

Some manufacturers also offer wireless options to increase flexibility at the emergency scene allowing the operating to be much farther away from the vehicle than with the wired remote control.

Panel mount controls are also an option. A panel mount control offers the flexibility of operating any light tower from anywhere on the apparatus or incident command vehicle, including the pump panel of a fire truck. The panel mount control can be added as an option along with the hand held remote control or in place of the hand held remote.

Remote control positioner

A light fixture positioner integrates solid-state circuitry to provide full rotation and tilt capability for the attached light fixtures on the tower. This allows the operator to precisely point the lights in any direction to illuminate a rescue scene, fire, ground or other work area.

Dual-tilting feature

Dual-tilting is a very important accessory to add to the light tower. Dual-tilting allows the bank of lights on each side of the light tower to shine independent of one another. This ensures the maximum scene illumination possible during an emergency operation allowing the operator to shine the lights in two different directions at once.

Obstacle detection

Some manufacturers offer obstacle and electrical power line detection equipment as an add-on for the light tower. These obstacle detection systems are mounted directly on top of the light tower and prevent the tower from colliding with any overhead obstruction. These systems offer power line detection, object proximity detection, tilt sensor detection, and above the light tower illumination.

Portable light towers

Portable light towers offer mobility and flexibility at the emergency scene. Portable light towers are light weight and can be quickly deployed. Since most manufacturers offer carrying bags with the equipment, emergency crews can carry the light tower and deploy it virtually anywhere.

Another benefit of the portable light tower is that it can remain at the scene as long as needed without fire department support. If a police squad is needed to stay longer for clean up or investigation, a portable lighting system does not require vehicle support.

Camera accessories

Today, emergency scene management and safety are greatly enhanced with the addition of cameras for monitoring, recording and surveillance. Some manufacturers are now offering camera mountings to their telescoping mast product lines or as an accessory to add on to a light tower.

Cameras can provide a unique perspective of the emergency scene and with zoom capabilities, personnel on the ground can survey the scene quickly and efficiently. Cameras also provide real-time monitoring and provide accurate records and documentation.

IFF



Mobilemast Portable Mast with Lights. Pic courtesy of Towermast, a Will-Burt Company

INDUSTRIAL



Pic courtesy of Reuters

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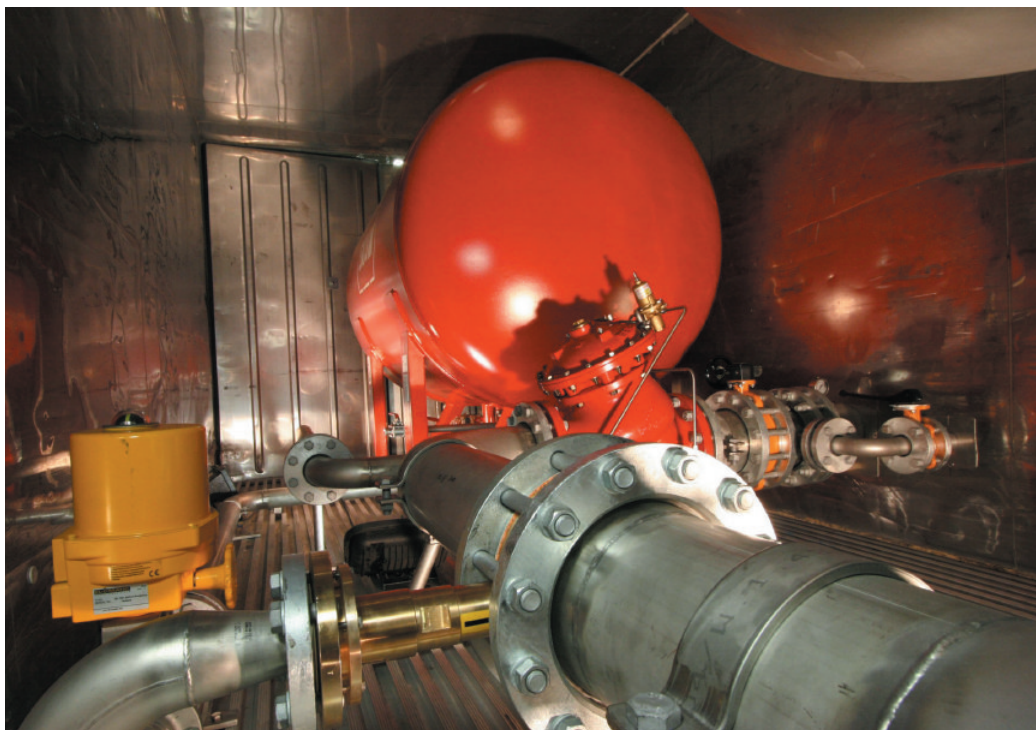
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A Sense of Proportion

By Peter Kristenson

Senior Manager,
Product Management
Team, for SKUM foam
hardware at Tyco Fire
Suppression & Building
Products

In a foam firefighting installation, the delivery hardware is every bit as important as the foam concentrate. If it lets you down at the critical moment, the care and attention you have lavished on concentrate selection will have been wasted, and you may well be staring disaster in the face.

To be effective, a foam firefighting system requires that a number of pieces of carefully matched hardware work together in unison to deliver a combination of water and foam in the desired proportions. If any one of these fail to perform, the firefighting effectiveness of the system will, at best, be impaired, at worst, be totally eliminated.

The failure of a firefighting system would be disastrous in any circumstances, but as most foam systems are used to protect high-hazard, high fuel load and potentially explosive facilities, the consequences could be commercially, environmentally and from a life-safety standpoint, nothing short of catastrophic. Such scenarios exist in a number of industries, most notably in the petrochemical, aviation, marine, the utilities and the mass transit sectors.

Put in its very simplest form, firefighting foam is made up of three ingredients: water; the foam concentrate; and air. The proportioning of the foam occurs when foam concentrate is mixed with a flowing stream of water to form a foam solution. This is mixed with air – the term normally used is aspirated – to produce foam that is a stable

mass of tiny, air-filled bubbles with a lower density than oil, petrol or water, allowing it to easily flow over the surface of the fire's fuel.

Balanced pressure proportioning

Although there are several methods of proportioning, fixed foam systems typically use what is known as balanced pressure proportioning for inducing the foam concentrate into the feed water line, so called because the foam concentrate pressure is balanced with the water pressure at the proportioner inlets. This allows the proper amount of foam concentrate to be metered into the water stream over a wide range of flow rates and pressures. Because balanced pressure proportioning equipment is capable of continuously generating large volumes of foam, these systems are commonly used to protect tank farms, jetties, chemical processing plants, offshore platforms, aircraft hangars, and loading racks.

There are two types of balanced pressure proportioning equipment. One type is used in foam pump systems, while the other is used in conjunction with bladder tanks. Both ensure accurate foam delivery to fire monitors and deluge systems.



Balanced pressure pump proportioning systems – sometimes known as pump systems – are used with atmospheric storage tanks that are most often made of polyethylene or glass-fibre. While the foam concentrate is pumped from the storage tank to the proportioner, an automatic pressure balancing valve regulates the foam concentrate pressure to match the water pressure. Bladder

tank systems use a pressure-rated tank that contains a reinforced elastomeric bladder to store the foam concentrate. Water pressure is used to squeeze the bladder to deliver foam concentrate to the proportioner, at the same pressure. An important consideration in making the selection of system is that the bladder tank system requires no external power source and very little maintenance.

The latest generation of SKUM™ low-pressure-drop balanced pressure proportioners for foam pump systems come in both standard and wide-flow designs that typify the performance of proportioners currently available on the market. The wide-flow proportioner has an orifice, the area of which changes in relation to the flow, ensuring the correct proportioning within a wide range of flows. The new line-up includes a number of options, with capacities that span from as low as 100 litres a minute (26 US gallons a minute) to a maximum of 37,850 litres a minute (10,000 US gallons a minute), with a maximum operating pressure of 16 bar (232 psi).

They offer accurate proportioning of the foam concentrate irrespective of any variations in the flow or pressure and incorporate the facility to site-adjust the proportioning over the full performance range, up to three percent. Standard balanced pressure proportioners are available with water inlet sizes of between 50mm (two inches) diameter and 250mm (ten inches), and 100mm (four inches) and 200mm (eight inches) diameter for wide-flow range proportioners.

Robustness and the ability to withstand the

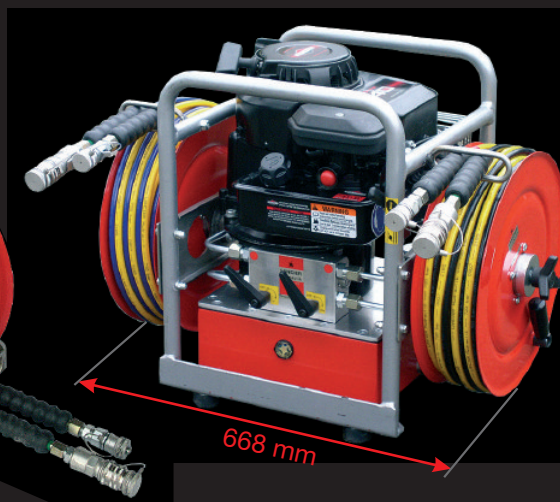
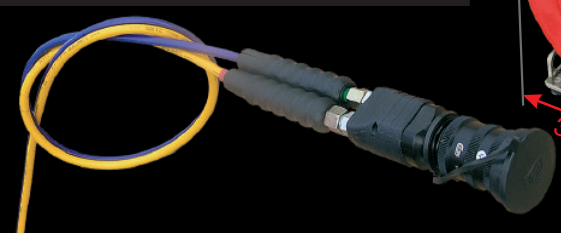


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rigours of often harsh or corrosive working environments is, obviously, a major concern. Again using SKUM proportioners as a top-end example, they are manufactured from high-grade corrosion-resistant bronze and stainless steel for reliable maintenance-free operation.

Bladder tank proportioners

Bladder tank proportioners from SKUM come in a similar number of design and performance options and are the ideal solution, particularly when upgrading an existing water sprinkler system to a foam/water system. SKUM pressure tanks are carbon steel and contain a butyl rubber bladder that contains the foam concentration. They are currently available either as a horizontal tank with capacities spanning from 400 litres (106 US gallons) to 25,000 litres (6,600 US gallons), or as a vertical tank with a lower maximum capacity of 12,000 litres (3,250 US gallons). However, plans are in hand to introduce larger tanks in the coming months.

Currently, bladder tank proportioners, which are also available in standard and wide-flow designs, offer similar capacities to the balanced pressure proportioners for foam pump systems, but with a slightly lower top limit of 34,100 litres a minute (9,009 US gallons a minute). Water inlet sizes for the standard models again span from 50mm (two inches) diameter to 250mm (ten inches), while the wide-flow range proportioners for bladder tanks are available in 100mm (four inches), 150mm (six inches) and 200mm (eight inches) diameter.

The proportioner is designed to fit between flanges. A distance equal to at least five times the water connection pipe's diameter is required before entering the proportioner, and the minimum distance for water pressure into the tank upstream of the proportioner is four times the pipe's diameter, with a maximum of ten metres (33 feet).

Around-the-pump and in-line inductors

Although commonly referred to as inductors, both around-the-pump and in-line inductors are proportioning units.

As well as being regularly used in marine applications, around-the-pump inductors are also utilised on specialised foam trucks and fixed

systems where a dedicated water pump is available. It is a foam concentrate proportioning unit that is designed for connection in a by-pass between the pressure and suction sides of the fire water pump that diverts a small proportion of the feed water flow, with a negligible effect on the fire water line pressure.

The stationary in-line inductor injects foam into a water stream. It can accommodate high back pressures, which increases the allowable distance between the foam injection point and the foam delivery device. Each inline inductor is factory calibrated for a given fixed flow/pressure setting, with foam induction of up to six percent. A number of variants are available in the SKUM range with connection sizes for 25mm (one inch) to 150mm (six inches) and water capacities spanning from 100 litres a minute (26 US gallons a minute) at 5 bar (74 psi) inlet capacity to 12,500 litres a minute (3302 US gallons a minute) at 16 bar (232 psi). **IFF**

Peter Kristenson is Senior Manager Product Management Team for SKUM foam hardware at Tyco Fire Suppression & Building Products. More information is available by telephone on +44 (0) 161 875 0402, by fax on +44 (0) 161 875 0493, or via email at marketing@tyco-bspd.com. The SKUM website can be found at www.skum.com



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Garments made of Lenzing FR® blends

– the best protection against heat and flame!

By Alexander
Gstettner

Protection against thermal hazards (flash fire, electrical arc discharge, molten metal splash) has evolved from no protection, to uncomfortable and even dangerous products (asbestos fiber, glass fiber, synthetic flame resistant fibers) to today's highly advanced fabric composites.

Certainly, the best protection against direct fire is achieved with flame resistant materials. However there are other sources of heat to consider when designing protective garments, namely, convective, conductive and radiant heat. In some cases people may be exposed to all three kinds of heat at the same time, at least temporarily. Take, for example, a molten metal factory where there is a high amount of conductive and radiant heat as well as a smaller amount of convective heat, not to mention the source of danger, liquid metal splashes and spots. The requirements for these workers goes far beyond simple protection from flames.

PPC should not only be protective – it should be functional as well

All physical activities require strength and movement. This movement, especially for a fire fighter

ones skin enhances ones performance in any type of situation. Clothing which does not take these factors into consideration can lead to the fatigue or the mental distraction of the wearer increasing the probability of occupational injuries – not forget to mention the possibility of heat stroke resulting from heat stress. Not taking these factors into consideration can create a hazardous situation for both the individual and their team.

Using and understanding the fibres and their properties

Any PPC coming into contact with fire or heat must be flame resistant but it must also be comfortable and able to absorb moisture. Achieving the required effects requires the uptake and lift of moisture. Therefore, functional clothing always consists of two fibre components, one which absorbs and hold wetness away from the skin and

To keep the body at an optimal temperature, allowing for optimal performance, PPC must lift moisture away from the skin allowing the body to maintain an optimum temperature.

or worker in the line of duty, produces heat and heat, coming from the body, naturally produces moisture and perspiration. To keep the body at an optimal temperature, allowing for optimal performance, PPC must lift moisture away from the skin allowing the body to maintain an optimum temperature.

The Process:

PPC lifts and absorbs wetness, wicking moisture away from the skin and allowing the evaporation of perspiration.

Research has proven, that using functional PPC increases the efficiency and effectiveness of the wearer. Having a dry and comfortable feeling on

one which remains dry creating a feeling of comfort for the wearer.

There are many Fibres existing on the market, which are being used for this application. These fibres have been proven to be excellent in respect to their flame resistance performance but their lack of moisture removing capability limits their functionality.

One alternative is a flame resistant cotton, i.e. cotton treated with a special flame resistant finishing. This of course reduces the flexibility and comfort of the garment and research shows that with wrong cleaning procedures and chemicals the garment is no longer as flame retardant as when they are new.

Science and nature joining forces

As with the majority of technological advances, the solution to the comfort issue was provided by a combination that exists in nature itself and some scientific ingenuity. Modal fiber is derived from pure wood cellulose extracted from beechwood. By applying state of the art science, this cellulose is then transformed into Modal fiber. An environmentally safe fiber, which is biodegradable and does not harm the environment in any way.

The fiber is made inherently flame resistant through the incorporation of an environmentally friendly, totally non toxic organic compound.

"Workers are only protected if they actually wear the protective apparel they are provided with."

It goes without saying that workers are only protected if they actually wear the protective apparel they are provided with. In this respect, it helps if the garment is comfortable! Furthermore, the worker's mobility and effectiveness has to remain as unimpeded as possible. It is in the realm of comfort and mobility that great strides have been made.

exclusive properties of permanent flame resistance and wearer comfort.

In addition to providing "comfortable thermal protection" the new generation fabrics also have some ancillary properties which are of interest to specific end users.

For **utility workers**, innovative fabrics have been commercialized which are blends of Lenzing FR® and Aramids. These fabrics are comfortable yet offer excellent protection against flame and high voltage electrical arcs. Utility workers appreciate the natural comfort as well as superior UV stability of the new generation garments.

For **hot metal splash protection**, (for example, in aluminum smelters and foundries), fabrics composed of Lenzing FR® and wool are not only comfortable, but have superior metal shed and cryolite resistance properties compared to previous generation fabrics. Because of the hot environment where these garments are worn, the excellent wicking properties contributed by Lenzing FR® add to wearer comfort. As with flash hoods, perspiration is wicked away from the skin and to the surface of the fabric. The subsequent

Modal fiber is derived from pure wood cellulose extracted from beechwood. By applying state of the art science, this cellulose is then transformed into Modal fiber. An environmentally safe fiber, which is biodegradable and does not harm the environment in any way.

Prominent textile mills globally have recently picked up on this idea that a fabric does not have to be "uncomfortable" in order to provide full protection. These innovative mills have developed and commercialized new protective fabrics in several new styles and colors with great success. Through the use of these newly developed fabrics, the major garment manufacturers and rental laundries have, in turn, been able to meet the end users needs; apparel that is comfortable without compromising the demanding requirements for protection.

Thermal protection – a double edged sword

The issue of thermal protection has traditionally been a double edged sword; if a protective garment insulated the wearer from outside heat and flame, it also insulated in the reverse direction. It could trap body heat and moisture inside the garment, leading to fatigue, discomfort, moisture buildup and loss of the body's ability to maintain proper body temperature (heat stress). This resulted in the so called "plastic wrap effect".

A new generation of thermal fabrics for specific endusers

Using the inherently flame resistant Lenzing FR® fiber, a whole new generation of thermal fabrics has now been developed. These fabrics effectively combine the historically mutually

evaporation helps to cool the wearer because of the latent heat of vaporization phenomenon.

Fabrics made with wool and Lenzing FR® fulfil Norm EN 531 with the following results:

- EN 532 – Limited flame spread Pass
- EN 366 – Radiant heat Level 2
- EN 367 – Convective heat Level 1
- EN 373 – Molten metal splash (aluminium) Level D-3
- Molten metal splash (iron) Level E-3

Several companies throughout the world in the aluminium, steel and iron sector have clothed their workers in garments made of Lenzing FR®/Wool blends and the results have been highly satisfactory.

For **welding industry applications**, new generation fabrics composed of Lenzing FR® and para aramids have been developed. They are proving to be the lightweight, comfortable solution for protecting the welder. There is also an added benefit; the wear life of these garments is up to 10 times that of traditional treated cotton products, providing excellent cost effectiveness, despite the higher initial cost.

For **petrochemical and general industrial applications** where protection against flash fire is required, Lenzing FR®/aramid blends are replacing heavier, less effective, chemically treated cotton shirts, trousers and coveralls. These new blends have resistance to a wide variety of solvents, acids, alkalis and other industrial substances. Yet, these

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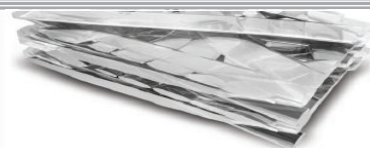


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new generation fabrics are comfortable, inherently flame resistant and cost effective.

Fabrics made with a blend of wool and Lenzing FR® offer natural protection. Highlights include:

- Permanent flame resistance regardless of the amount of laundering
- Good protection against convective heat
- Good protection against radiant heat
- Excellent resistance against molten metal splash
- Excellent wear comfort
- Easily dyed – produces brilliant colours
- Good colour fastness to light and laundering
- Breathable and non irritating to the skin
- Inherently anti-static
- Easy care
- Right cost

Features of aramid/Lenzing FR® blends include:

- Lightweight, comfortable fabrics with higher moisture regain than 100% aramid.
- Soft, smooth and comfortable against the skin
- Long lasting durability versus FR treated cotton and cotton blends
- Natural 'chambray' appearance
- Better light fastness than piece dyed aramids
- Excellent pilling resistance
- Easy care; no touch up ironing required

extremely comfortable.

Here, as in the cotton/polyester example above, a balance has to be achieved between two competing properties – durability and comfort. Or, to be more precise; advantage can be taken of the synergy between flame Lenzing FR® and aramid fibers. The balance is determined by the end use application of the fabric/garment.

For example, for firefighter's bunker gear, physical strength and durability is of the essence, so 100% aramid construction makes sense.

Alternatively, for children's nightwear, comfort is of the essence, so 100% inherently flame resistant Lenzing FR® makes sense.

For most industrial applications, however, the best balance between protection and comfort lies somewhere in between. Research in this area shows that Lenzing FR®/aramid blend levels of 50/50 are a good starting point. But these levels can range from 20/80 to 80/20 depending on the balance of properties to be achieved.

Lenzing AG, in cooperation with other fibre producers, developed yarns and, subsequently, fabrics based on varying blends. The results obtained from several tests clearly showed that this new generation of fabrics was a great improvement in many ways. Compared to 100% aramid fabrics,

For most industrial applications, however, the best balance between protection and comfort lies somewhere in between. Research in this area shows that Lenzing FR®/aramid blend levels of 50/50 are a good starting point. But these levels can range from 20/80 to 80/20 depending on the balance of properties to be achieved.

The balance between protection and comfort

So, for numerous applications, Lenzing FR® flame resistant fibers would seem to be "the perfect solution".

But we all realize that in an imperfect world, there are seldom perfect solutions. . .

By way of analogy, in the consumer market, polyester was introduced years ago as a solution to enhance the care properties of pure cotton garments. But, simply replacing the cotton with polyester would solve one problem and simultaneously create another. Pure polyester was not very comfortable. Eventually, the consumer determined that a blend of cotton and polyester gave the best of both worlds. Cotton for comfort, polyester for easy care. Ultimately, the optimum blend ratio was determined by the balance that the consumer wanted between comfort and easy care.

Similarly with thermal protection fabrics; there are balances to be determined. Let us consider the properties of two widely used fibers with inherently flame resistant properties.

At one end of the spectrum are the synthetic fibers, such as aramids, which are inherently flame resistant and extremely durable.

At the other end of the spectrum is Lenzing FR®, which is inherently flame resistant and

these new blends offered equal or better protection against heat and flame and at the same time brought about a whole new level of comfort.

The three C's

The protective apparel industry speaks of the three C's that it needs to address on an ongoing basis; **Compliance, Cost and Comfort.**

Compliance is a given; today there is an array of fabrics available which are compliant with current government, military and industry requirements and standards.

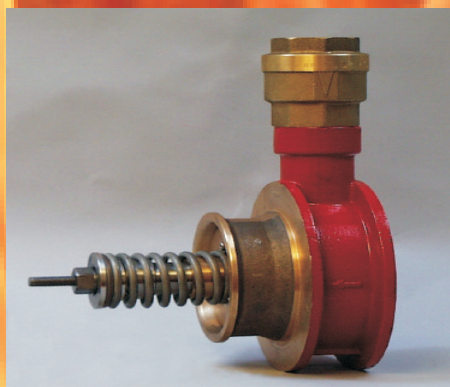
Cost of compliant fabrics is determined by the competitive nature of the protective apparel industry. Effectively this has resulted in increasingly better protection at lower prices.

Comfort is an ongoing and increasingly more important issue. Comfort can now be incorporated as a permanent feature in thermal protective apparel. And in most cases with simultaneous cost savings to the end user.

Prominent fabric manufacturers, in close cooperation with garment makers are ready to offer fabrics made of Lenzing FR®, blended with aramids, high performance fibres or simply wool and garments on a worldwide basis in order to ensure healthiness, protection and comfort on the workplace.



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20 Years After Piper Alpha, Fire Is Still The Nightmare Scenario

By John Allen

EMEA Marketing
Director, Tyco Fire
Suppression & Building
Products

In 1988, an explosion and subsequent fire destroyed the Piper Alpha oil production platform in the North Sea killing 167 men. 20 years on, it remains the world's worst-ever offshore oil disaster in terms of both lives lost and impact on the oil industry – the total insured loss was a staggering US\$ 3.4 billion.

The impact of the Piper Alpha disaster still reverberates around the world, and safety briefings for people working offshore often still incorporate video footage of the horrific scenes that are indelibly etched on people's minds. This surely reminds us that few locations present greater fire suppression challenges than offshore platforms. Well beyond the immediate reach of outside help, at the mercy of virtually limitless supplies of highly combustible liquid and gas, and with no easy escape for the platform workers, these environments demand firefighting systems

that are unerringly robust, and set the highest achievable standards of fast and efficient fire suppression.

While the incidence for fires on oil rigs – certainly on the scale of the Piper Alpha disaster – is, thankfully, relatively low the potential for loss in life and the destruction of high-revenue-earning assets is ever present, perhaps more so than in any other industry. Today, oil platform workers are probably among the best trained of any industry when it comes to fire safety, and oil companies are to be commended for the way in which

commercial competition is put aside where fire safety issues are concerned. This is evidenced by the collaborative work of such organisations as JOIFF (Joint Oil and Industry Fire Forum). New offshore platforms are now constructed with meticulous care and attention being paid to the fire safety implications. However, offshore fires do occur, and when they do, firefighting systems are tested to the limit.

Fire suppression systems on oil platforms have to withstand the rigours of a hostile and highly corrosive environment, they must be easy to maintain, and respond quickly to rapidly developing fires that typically have high heat-release rates.

Today, oil platform workers are probably among the best trained of any industry when it comes to fire safety, and oil companies are to be commended for the way in which commercial competition is put aside where fire safety issues are concerned.

They must also have a high degree of reliability, as any second line of firefighting defence is not likely to make a meaningful impact before the blaze has developed far into the life and asset threatening phase. Putting it as starkly and simply as possible, there is no scope for containing a fire on an offshore platform until trained firefighters appear over the horizon.

An oil rig fire potentially involves uncontrolled hydrocarbon release; firefighting efforts are entirely in the hands of the rig's workforce, and evacuation epitomises the expression "caught between the devil and the deep blue sea", particularly if the incident has – as often happens – resulted in oil spillage into the surrounding water.

From the firefighting perspective, installations can be divided into two areas. These are what might best be described as the "topside" or production areas – the off-loading, drilling and platform wellhead areas, plus the platform helicopter pad – and the associated control facilities. With the ready availability of limitless supplies of seawater, deluge systems were frequently used to protect certain areas of the production facilities. However, fixed foam firefighting technology is fast becoming more commonplace as a quicker and more effective means of suppressing a hydrocarbon fire in the often unpredictable wind and weather conditions experienced in deep waters. Control and communications facilities on oil platforms are now invariably safeguarded using gaseous suppression systems.

Offshore foam delivery

AFFF (Aqueous Film Forming Foams) foams have been used on oil rigs and production platforms for many years, as they meet the industry's quality standards; they can be used with a wide range of

equipment, and have an acceptable shelf life. However, the effectiveness of a foam firefighting system, whether onshore or offshore, is also dependent upon the efficiency of the foam delivery system.

There are a number of foam delivery systems that are specifically designed for fighting oil platform fires, an example of which is the SKUM™ Helideck firefighting system, which can be adapted to suit the dimensions and layout of the helicopter landing deck.

The major components of a typical installation are a displacement pressure proportioner with a foam concentrate tank – more commonly referred to as a bladder tank – and two foam monitors, one placed on either side of the helideck. While the bladder tank offers the advantage of combining a storage facility for the foam concentrate with a proportioning device, its reliability is boosted by its being completely independent of any external power sources; it also has very few moving parts.

Water under pressure is all that is required to operate the system, and the measuring orifice can be placed at any convenient location between the bladder tank and the monitors. In many cases this is a 600-litre bladder tank/automatic proportioner and two SKUM foam monitors, each with a capacity of 2,500 litres a minute.

Fixed gaseous suppression

Until the 1990s, the majority of platform control rooms and communications centres on offshore platforms were protected by Halon 1301 systems. However, with the demise of Halon 1301 following the signing of the Montreal Protocol, an increasing number are adopting the SAPPHIRE™ fire suppression system that was launched towards the end of 2004 and has several major advantages

SAPPHIRE has a negligible impact on the environment and an insignificant global warming potential, substantially lower than any of the halocarbon agents that are acceptable for use in occupied spaces.

over other Halon alternatives currently on the market that have unacceptably high global warming potential.

SAPPHIRE utilises the 3M™ Novec™ 1230 fluid. It is sustainable, long-term technology that has amassed a host of international approvals and not only satisfies today's legislative requirements; it also meets all of those in the foreseeable future.

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The suppressant is stored as a low vapour pressure fluid that, when discharged, converts into a colourless and odourless gas. Typical total flooding applications use a concentration of the fluid that is well below the agent's saturation or condensation level, and the fluid has the lowest design concentration of any viable Halon 1301 chemical alternative. While certain halocarbons and inert gases are used at design concentrations that are below the NOAEL or No Observed Adverse Effect Level, with safety margins from seven percent, the Saphire system provides platform operators with a huge safety margin.

Inert protection

While safety and asset protection are clearly the offshore industry's primary drivers, their marketing campaigns clearly show that many are committed to achieving a more environmentally-responsible stature and are investing heavily in environmental initiatives.

This has filtered down to a concern regarding the environmental performance of the products and systems used on offshore platforms, and has led to a growing interest in the use of inert gas fire suppression systems that are non-toxic, non-corrosive and odour-free, zero ozone depleting and with zero global warming potential. The result is an increase in the use of inert gas systems to protect enclosed offshore facilities.

The latest generation of these inert gas systems is the INERGEN® PLUS system that, along with

meeting all of the environmentalists' demands, provides platform operators with significant and measurable installed cost savings when compared with typical "standard discharge" high-pressure inert gas systems. It incorporates patented constant-flow valve technology that significantly enhances the system's performance by eliminating the need for high-pressure pipework, reducing the requirement for room venting, lowering installation costs and reducing room turbulence on agent discharge.

It is a total-flooding system that uses a mixture of naturally occurring gases and so is a truly sustainable "clean" fire suppression technology. It is also fast acting, electrically non-conductive and has no breakdown products or residue to damage to sensitive equipment.

Ever present threat

Advances in fire safety technology, coupled with an understanding of the importance of risk assessments and the implementation of soundly thought out fire safety strategies has been noticeable over the past two decades. So much so, that tried-and-tested solutions are now available that safeguard both the corporation's assets and the lives of those who work in what by any definition is an arduous and potentially dangerous environment.

However, an offshore platform fire can take many forms: fuel-controlled pool fires are characterised by a rapid rise in temperature, up to 1300°C; continuous-release jet or spray fires have high heat fluxes that can quickly lead to structural failure; flash fires and fireballs produce thermal radiation and can quickly escalate and generate secondary fires. So, offshore fire safety should never be seen as just a matter of having

**No amount of personnel
preparedness will make up for
the installation of firefighting
installations that are simply
not up to the task.**

available the best firefighting agents and delivery systems – frequent and repeated training is absolutely imperative; so too is the regular professional maintenance of every piece of fire safety equipment.

That being said, no amount of personnel preparedness will make up for the installation of firefighting installations that are simply not up to the task. These must be systems that can be relied upon to swiftly extinguish fires and reduce the likelihood of escalation; and where appropriate, reduce the fire's heat and limit heat radiation and smoke movement.

IFF

John Allen is EMEA Marketing Director at Tyco Fire Suppression & Building Products. He can be contacted by telephone on +44 (0) 161 875 0402, by fax on +44 (0) 161 875 0493, or via email at marketing@tyco-bspd.com

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Matching Vehicle Design To The Firefighting Challenge

By Greg Richardson

Fire Engineering &
Technical Manager,
Sembcorp Protection
Group on Teesside

There is no such thing as “one size fits all” when it comes to purchasing a new firefighting or rescue vehicle, so getting the specification right is a complex task that demands a careful assessment of precisely what is required and expert attention to detail.

Whether the firefighting vehicle is destined for a municipal brigade, a civil or military airport authority or, in the case of Sembcorp, a high-hazard industrial emergency response organisation, it represents a major capital investment. The vehicle has to be designed and built to combat a set of very specific fire safety challenges; it must be capable of tackling both current and anticipated future fire scenarios; and it has to perform alongside other equipment as part of a fully integrated and reliable fire and rescue solution.

Perhaps the best way to illustrate how this can be achieved is to describe the process implemented by Sembcorp Protection Group for the latest addition to its firefighting and rescue fleet at the Wilton International site on Teesside in the UK. The specification for a new first-turnout firefighting vehicle to further boost its emergency response capability was established just prior to the acquisition of a new water support vehicle in mid-2007. This is a high-capacity, fast-support unit that is fitted with the latest technology to enable the transference of water whenever and to



wherever it is needed in the right quantity and at the right pressure. The unit incorporates 2,000 metres of 125mm diameter hose that is stored flat and can be deployed from the unit in a matter of minutes, enabling water to be moved quickly over long distances with minimal friction loss. The unit also has capacity for a further 2,000 metres of hose to increase the reach to 4,000 metres.

This support unit joined a high-risk environment emergency response fleet that includes two E-One American appliances – one delivers 22,701 litres a minute of foam or water, and the other 11,355 litres a minute. There are also four triple-agent appliances, each with a maximum pumping capacity of 4,500 litres a minute, and one appliance with a capacity of 10,000 litres a minute that holds up to 4,500 litres of Angus Tridol AFFF foam and up to 750kg of dry powder. This is supported by 120,000 litres of Angus Tridol foam concentrate – the largest industrial stock of foam concentrate in the UK.

Hazard evaluation

The first task was to establish as precisely as possible the threats and challenges with which the new appliance was likely to have to contend. In

this instance, the new vehicle was destined to play a leading role in safeguarding £14 billion of high-hazard chemical processing and storage assets on a number of sites on Teesside in the northeast of England. This immediately suggested a short-form specification that included high-performance systems and equipment, various types of foam proportioning, water/foam monitors, and complementary extinguishing systems such as dry powder chemical agents.

Sembcorp's assessment also took into account the operational experience gained from attending incidents, and the facilities already available within the existing arsenal of firefighting and support appliances. To ensure that the new vehicle would meet future emergency needs, discussions also took place with Sembcorp's customers to ascertain any significant changes that might have an impact on the current fire strategies that would need to be taken into account. Similarly, discussions were also held with existing and potential equipment suppliers to review the latest technology and imminent developments.

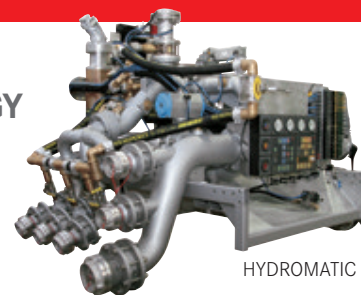
This resulted in the creation of a four-point, broad-brush "shopping list" for the new appliance. It had to be a first-turnout appliance that could



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deliver large volumes of water or foam for larger fires, and have Hydro-Chem technology for large pressure and flowing fuel fires. To be compatible with other recently purchased Sembcorp appliances, and for ease of spares and repair, it had to be on a Volvo chassis, and had to offer both pump operation and equipment retrieval that was swift and user friendly. This identified the four key areas that the specification needed to address: the chassis; bodywork superstructure; firefighting systems; and equipment and accessories.

The specification for the new front-line vehicle was based around the new 440bhp Volvo FM 440 chassis and incorporates a 10,000 litres a minute water pump that is supplied by four 64mm inlets and two 128mm vacuum or pressure inlets. Water and foam is delivered via a dosifor foam injection system through four 64mm water/foam units, two 64mm and two 128mm water-only units and a 3,800 litres a minute to 11,400 litres a minute Williams Fire & Hazard Control Ranger3 roof monitor with Hydro-Chem technology for extinguishing three-dimensional fires involving liquids and gases under pressure. The vehicle's internal tank capacities are 600 litres of water, 3,000 litres of Angus Tridol AFFF one percent and three percent concentrate, 250 litres of Angus TF 3 fluorine-free training foam, and 500kg of Purple K dry chemical powder, which is discharged via two Williams Hydro-Chem branches that are located on either side of the appliance.

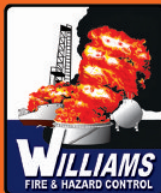
Equipment selection

In contrast with appliances in the existing Sembcorp Protection Group fleet being either first-turnout appliances or large "pumpers" on American chassis, the new unit is a versatile hybrid of both. This allows its role to be changed to reflect the firefighting demands of a developing fire. Instead of having to withdraw one appliance and replace it with another, it is necessary only to add to the water supply and increase its delivery options using the roof-mounted Ranger3 monitor or external monitors via 128mm outlets.

However, dependence on such versatility does mean that the chosen firefighting systems, equipment and accessories have to be of the highest uncompromising standard.

All of the equipment and firefighting agents – including the pump, tanks, the monitor, outlets, foam concentrates and chemical powder – were selected because of their proven performance in the global petrochemicals firefighting arena. Most of the equipment specified is also currently used on other Sembcorp appliances so is familiar to the operational crews. Nevertheless, demonstrations of all of the key pieces of equipment were held to ensure that each item delivered the required performance.

For example, the Hydro-Chem system was chosen because it uses the foam solution to propel the dry chemical powder agent approximately three-to-four times farther than is achievable with conventional dry chemical equipment. This gives the firefighter a safer and more efficient means of delivering the dry chemical onto the large pressure and flowing fuel fires that, potentially, Sembcorp firefighters have to face. The technology also allows ground or spill fires to be extinguished using foam only, which harnesses the three-dimensional fire, greatly reducing flame intensity.



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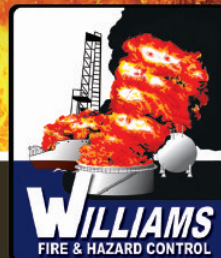
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After this heat reduction, dry chemical is then injected into the foam stream, resulting in a more efficient extinguishing of the fire.

Tendering process

Firefighting and rescue vehicle building is a truly international business; few manufacturers are dependent upon their home market. In this instance five companies were approached – two British, one American, one German and one French – all of which met Sembcorp's baseline design and manufacturing capabilities requirements.

Two companies were shortlisted; both were inspected and the people who would be responsible

for the completion of the project were met and assessed. The contract was ultimately awarded to the French manufacturer, SIDES, which is based in St Nazaire, and has the capacity to build 600 vehicles a year for aviation, industrial and municipal brigades throughout the world, many of which are bespoke units.

While the vehicle design utilises a conventional commercial Volvo chassis, the superstructure of the vehicle was custom-built and all of the components were all to Sembcorp's specific requirements. This inevitably caused occasional delays. However, SIDES experience in building one-off firefighting trucks, the way in which the factory is set up for built-to-order production and the professional way in which the company does business kept these to a minimum. Issues did occasionally arise over interpretation of Sembcorp's specification, so a degree of flexibility regarding delivery times and a contingency for minor changes are sensible precautions. Again though, these were minimised by building into the programme formal site visit meetings at the pre-build, intermediate build and commissioning stages.

In the event, the project took two years to complete from specification to delivery. The chassis was ordered in April 2007, was delivered to SIDES in February 2008, and the new commissioned vehicle was finally placed "on run" in Teesside in January 2009.

IFF

Greg Richardson is Fire Engineering & Technical Manager at Sembcorp Protection Group on Teesside.

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*Pic courtesy of
Ron Puttock*



Gatwick Airport Fire Service Profile

**By Andrew
Dumsday**

Leading Fire fighter,
Gatwick Airport

Gatwick Airport is a category 9 airport and therefore requires an appropriate fire and rescue service in order to protect life and property against some unique risks. Thirty million passengers annually pass through Gatwick's two terminals. The number of flights and the size of the aircraft to facilitate our customers necessitates a well equipped and highly trained fire service.

Gatwick Airport Fire Service is proud that it meets and exceeds all required CAA standards for rescue and fire fighting at aerodromes. As well as the protection of life, aircraft and terminal buildings, additional challenges also include a busy cargo facility, a main line train station and roads and motorway infrastructure, all requiring versatile skills and equipment.

Gatwick Airport operates the busiest single runway operation in the world. There is one fire station that provides a response to all airport areas. This enables us to meet our response commitment, which is a response time of no more than two minutes thirty seconds to either end of the runway.

Our 78 strong operational team is divided into four watches which consists of Red Watch, White Watch, Blue Watch and Green Watch and provides continuous support around the clock 365 days a

year. In addition, there are two senior officers and one administrator.

The Management team which is headed up by the airport fire manager (AFM) Jason Ivey are focused on providing a fire fighting service in accordance with regulatory and BAA requirements and agreed standards to enable the business to maintain its license to operate, ensuring business continuity in line with the airside team.

Jason is also responsible for motivating and developing a high performing team to achieve agreed objectives, consistently improving the quality and service delivery. Other duties include the provision and maintenance and control of budgets to meet cooperate, local and statutory requirements.

The Deputy Airport Fire Manager (DAFM) is Phil Rowsell. His accountabilities are varied and include the support of the AFM in providing a fire fighting

*Pic courtesy of
Ron Puttock*



service in accordance with regulatory requirements and to company agreed standards. Phil is also on hand to assist and support the performance of individual team members as well as to continuously monitor and develop a safety management system approach to ensure that colleagues and customers are not put at risk.

Gatwick Airport's Fire Station is located on the North side of the airfield adjacent to taxiway Juliet and stand 169. The station houses:

- One command and control unit.
- Five Mac 11 major foam tenders
- One Mac 8 medium foam tender.
- One Scania hose layer.

The operational crew based at Gatwick Airport Fire Station comprise of one Station Manager, one Watch Manager, 14 Fire Fighters (including a Watch room attendant). The senior officers and administration staff are also located within the fire station.

Training

In order to provide realistic and challenging fire training at Gatwick Airport the airport fire service utilise a fire training simulator with 11 internal and 18 external fire scenarios. The training simulator is a full size replica of a Boeing 747 aircraft with a McDonnell Douglas MD11 tail engine. The starboard wing is a 777 plus engine and undercarriage. The port wing is a 747 plus engine and undercarriage.

The various scenarios are as follows:

747 Portside

- Inner undercarriage internal and external brake fires.
- Outer undercarriage internal brake fire, inner wheel fire, fire spread up oleo leg to link under wing.
- Engine has three scenarios: tailpipe, exhaust and intake.
- Fuselage fire under wing fire and fuel spill fire (7m x 7m).
- MD11 aircraft tail engine fire and auxillary power unit (APU) fire.

Starboard side 777

- Two undercarriage fires, internal brake fire and two wheel fires.
- Engine has four scenarios: tailpipe, exhaust, intake and access panel.

- Fuel spill fire (7m x 7m) plus running fuel fire from 777 engine.

Upper deck

- Flight deck engine fire panel.
- Overhead instrument panel.
- Bed Fire
- Galley Fire
- Rollover ceiling fire

Mid deck

- Overhead storage locker
- Galley Fire
- Toilet Fire
- Seat Fires 1-4
- Burning crib for breathing apparatus chamber also for domestic fire role set out in office style.

Lower deck

- Unit load device

Gatwick Fire Behaviour Multi Training Facility

Apart from the aircraft simulator Gatwick also has a Fire Behaviour Multi Training Facility. This is an ingenious training aid which was designed by Gatwick fire fighters along with the help of Devon, Somerset Fire & Rescue Service and the manufacturer, Transitional Fire.

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Along with breathing apparatus instructors, Gatwick has 8 fire behaviour instructors trained by Devon, Somerset Fire & Rescue Service. Practical fire behaviour training is backed up by theory and classroom training aids.

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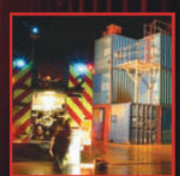


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Above all

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Paul Furler*



Fire behaviour and compartment fire-fighting training in Manizales, Colombia

Following a training visit to Colombia by Fire Officers Peter Sandel and Paul Furler from Devon Fire & Rescue Service in September 2006 and the subsequent fact-finding visit and practical mission by Hector Raul Gonzales and Diego Moreno of the Colombian Fire Service to Devon's Breathing apparatus and Fire behaviour Centre in 2007, three officers from Devon have recently spent a further period of time in Colombia extending their training to the next level.

By Paul Furler

My last report for International Fire (issue 15 – August 2005) I concluded with the possible provision of a Fire behaviour (Demonstration) container in the City of Manizales in the region of Caldas, and with the intervention and help of DSFRS to provide Instructors in the City to deliver the training, in the first instance to the Fire-fighters of Caldas and ultimately to cascade the training to the Fire-fighters of Colombia.

I reported that two Colombian Fire Service Instructors had taken part in a month of intensive training with DSFRS during May 2007 predominantly at our BA and fire-behaviour training centre at Exeter Airport.

Following their training in 2007, Hector and Diego returned to Colombia completely 'sold' on the concept of the training that they had received here and with the support of Mrs Pilar Perez (the

*Pic courtesy of
Paul Furler*



Regional Emergency response co-ordinator), set about putting in place the necessary resources to provide a training facility in Manizales.

Between 2007 and 2008 there was considerable discussion and debate as to the best use of the limited funds available for such a project.

During their time with us in Devon Hector and Diego were able to view a number of part completed containers at the 'Transitional Fire' Factory at Ottery St Mary, one of these was a combination 'Demo/Attack' container that comprised of an extra long demonstration container with a

swinging partition door so that it could be converted for either purpose.

Although not ideal it did provide a cheaper alternative to achieve the ability to provide demonstration and attack training but with the cost of one rather than two containers, it also transpired that initially there would be only the space available at the chosen site for one container to be accommodated so it made sense to maximise the potential for the container.

Mr Graham Leney (managing director) has been very supportive of the project and very kindly



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provided plans for the fabrication required to produce the Fire behaviour container from a basic shipping container so that our colleagues could return to their Country with that information.

During the latter part of 2007 the container was purchased with a view to carrying out the construction and training in January 2008 but due to Political changes in Caldas this had to be postponed until September 2008.

Funding for the three officers, Peter Sandel, Paul Furler and Nigel Snowshall to travel to Colombia and the purchase of the container was finally put in place with funds raised by the Mayors Office of Manizales and local Volunteer Fire Stations of the region of Caldas during August 2008.

The allotted training site is next to Manizales 2nd Station which is immediately adjacent to the main technical college for the region of Caldas and students from the welding school there had been pre-fabricating items required for the construction process for many months before our arrival although the dimensions of certain items did not translate from UK English to Colombian Spanish terribly well and so had to be completed during our planned construction period.

As well as being a Fire behaviour Instructor Nigel Snowshall has an Engineering background and was instrumental in the construction of our initial containers in Devon; consequently he was the natural choice to lead the construction phase of our time in Colombia.

Through our interpreters he was able to co-ordinate the process with the help of

the College Instructors, their students, and the Manizales training staff.

The construction was scheduled to be complete after the first 10 days but due to a number of delays took the full first two weeks. The effect of this was that the two 'Instructor training' courses had to be re-scheduled for the third week of our visit and that the two three day courses would have to run back to back.

The main objective of the visit was to enable the region of Caldas to carry out Fire behaviour and compartment fire-fighting training safely under the Instruction of Hector and Diego.

We were very conscious that they would need a good team of well-trained assistants to achieve the training of the several hundred fire-fighters in the region and that it would be very unwise to attempt such an arduous training schedule without sufficient resources and staff in place.

The first 3-day course was therefore designed to train the support staff, to highlight potential



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assistant Instructors and to refresh Hector and Diego's practical skill by running Demonstration, Attack 1 and 2 sessions under our supervision, for their students.

The importance of this procedure became very quickly apparent during the first day as one early session had to be abandoned after the pump was left unattended, subsequently failed and with no back up available the students were withdrawn from the exercise.

The lesson was learnt however and from that moment on a spare Fire pump, dedicated equipment and a support team was always available. The abandoned exercise meant that a new container had to be prepared and loaded, cylinders charged and resulted in a very late completion of activities for the day.

The format of the two courses involved two

demo sessions on the first day, after which the course was divided into two groups. On the second and third days an attack session was run in the morning and afternoon with Hector and Diego changing roles on each occasion.

Our host Mrs Perez has always been insistent that her intention is to spread the technique to the rest of Colombia, and she informed us that she felt the best way to achieve this in the short term is to have two training facilities, one in Manizales and the other in Bogotá, the two cities being diametrically opposite each other would provide reasonable access for regions in the North and South of the Country.

Consequently she had arranged for the two Officers in charge of training for Bogotá and 4 of their general training Instructors to take part in the initial 3-day course.

The first course produced some very committed students and likely candidates as assistant Instructors, the majority of which returned to act as support staff for the second 3-day course.

Until Bogotá has its own facility the intention is that the trained staff will travel to Manizales to assist Hector and Diego on a regular basis to maintain their skills.

As a result of their involvement we were requested to take part in a meeting at the Bogotá Fire Service HQ during spare time between flights on our way back to the UK with Senior Officers of the City.



*Pic courtesy of
Paul Furler*



*Pic courtesy of
Devon & Somerset Fire
Rescue Service*

It is clear that they would like our assistance to carry out a similar process in Bogotá as soon as this can be facilitated and it would seem that they have the funds to achieve this.

We have advised that it would be in their best interests to go through a similar process to that of Hector and Diego, and for their potential Instructor staff to attend a full Fire Behaviour Instructor course before they construct a container and attempt to run courses for their 800 fire-fighters.

There is a possibility that Training Officers from Bogotá will travel to Devon during 2009 to receive similar training that of Hector and Diego, officers from Devon would then return to Bogotá in January 2010 to help them construct a Demonstration and an Attack container and assist with the commissioning and initial training on the same basis as in Manizales.

Before our departure from Manizales we were invited to a reception with the Mayor and Chief Fire Officer of Caldas and various dignitaries.

Unbeknown to us we were to be honoured for our involvement with the Fire Service there over the past ten years by a ceremony in which we were given the freedom and the keys of the City of Manizales.

This honour was duly passed onto the retiring Chief Fire Officer of Devon Fire & Rescue Service Mr Paul Young OBE MPIL FI E who was instrumental in starting the project in Colombia over 12 years ago, at a ceremony at the Service headquarters at Exeter, Devon.

It is easy to forget that only two years ago when Peter Sandel and I delivered training with the MOD Siebe Gorman BA sets and UK safety procedures for the use of BA that BA sets were rarely used operationally in the region and remained in their boxes on top of the appliance at incidents at that time.

Now, as a matter of course, Fire fighters are wearing BA and are now confident enough to use the branch techniques that we have introduced

and are receiving practical compartment fire-fighting training.

It was extremely satisfying to observe this and that Fire Kit donated by Brigades in the UK ten years ago and the Siebe Gorman BA sets donated 5 years ago are both in good condition and being put to good use for the benefit of the community.

Fire Investigation

On the visit to Colombia on this occasion it was also planned to give two days of succession training in fire investigation techniques dependant upon how the primary project on fire behaviour progressed.

With the delays and setbacks encountered it soon became clear that this would not be achievable so was cancelled very early into the visit.

However on the last day of the project and during our time in Bogotá, time was spent with the City's lead fire investigator Carlos Oviedo a lieutenant in the Bogotá Fire & Rescue Service.

We explored how to progress and develop the available skills of the current investigators and bring on new candidates. The major problem being the language barrier, in that all previous courses delivered required a translator with a complex knowledge of fire terminology.

The organisation to which Mr Peter Sandel belongs, and who certify investigators worldwide to a recognised professional standard (The International Association of Arson Investigators) were approached and asked for assistance in setting up the first branch in Latin America and offering training opportunities in Spanish.

This project is now being progressed and it is hoped that in the not too distant future Colombia will have a branch of the IAAI and access to all the development and training funds available to new groups and guidance from the organisation both from Mr. Sandel a Certified Fire Investigator in the UK, and the headquarters in the United States who have the major resources and online training facilities.

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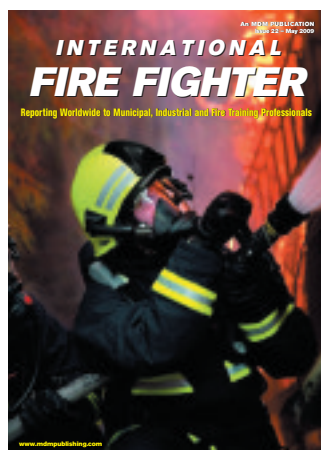
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One company who has managed to adapt is GSF Slides, whose cold drawn steel slides are used throughout the UK and Europe's blue light and fire industries. Andrew Yenser, Rescue Product Development manager at KME explains: "It was the strength and



quality of the GSF slides that caught our attention; both are qualities to which we build our apparatus."

Indeed, KME's apparatus range is so

extensive, from Rescue vehicles to Pumpers, that such a decision cannot be taken lightly. "Prior to offering GSF products on our apparatus," continues Andrew, "an evaluating committee at KME thoroughly reviewed the materials, mechanics, serviceability and availability of the slides. Approving new products by committee allow KME to ensure components meet both our safety and quality requirements."

"Currently the slides are being integrated onto our Rescue trucks and then to the

balance of our product lines. The first GSF product we will be using will be the slide and tilt rollers and we will be later adding the RA5 and RA7 slide assemblies to production."

KME's production is by no means simple; in addition to Rescue vehicles, the company also custom manufactures its own custom chassis, pumpers, tankers, aerials, and airport crash rescue vehicles. The rescue product group alone comes with 300 custom cab configurations, including a host of other specs like Light Towers, Cascade systems, Generators and other walk-round/walk-in body structures.

London Fire Brigade places major order with Draeger

The London Fire Brigade has placed a major order with DRAEGER for both breathing apparatus and monitoring systems. Representing a significant level of investment, even for the UK's largest firefighting service, the order also reflects a major commitment on behalf of both parties to work closely together to ensure even greater protection for the country's leading fire brigade.

Officially announced on Tuesday, 12 May, 2009, the substantial order encompasses Draeger PSS 7000 Breathing Apparatus sets together with FPS 7000 Face Masks, PSS Bodyguard 7000 electronic monitoring systems and innovative PSS Merlin Telemetry boards. Believed to be unique, the order also includes newly developed 8-litre 300 bar cylinders which provide half an hour working duration at 50-litres/minute breathing rate. The new equipment will be on the run by January, 2011.

Perry Jones, Sales and Marketing Director at Draeger, comments, "We are obviously very pleased that the London Fire Brigade has recognised the benefits of our modular system approach. By choosing the Draeger PSS range, the Brigade has selected a system that will successfully meet its' needs today whilst continuing to grow to meet its' needs well into the future. Combining innovative comfort and performance that has been borne from years of product research and development, the PSS system is the result of our work with different Brigades in all kinds of applications. Bringing real-time monitoring to the fore, it has also



helped to revolutionise communications as well as firefighter safety."

London Fire Commissioner Ron Dobson said: "I am delighted that we are working in partnership with Draeger to take advantage of technological advances made over the last ten years and further enhance the safety of London's firefighters."

This contract has been awarded through the Firebuy framework.

Further information is available from:
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Blyth Riverside Business Park, Blyth
Northumberland NE24 4RG
Tel: 01670 352891
Fax: 01670 356266



This is where GSF Slides have really come into their own; apart from their ability move heavy equipment directly to where its needed, GSF slides are easy to install and maintain. Andrew Yenser Concludes: "One of the key benefits for us is that the installation of the product has been easy to integrate into our production. The strength and reliability of the GSF products allow us to offer an additional component to enhance the safety and efficiency which our customers require from our apparatus."

For more information:
KME: www.kovatch.com
GSF Slides: www.gsf-promounts.com

ROSENBAUER E8000/E3000 rescue stair vehicles for German airports

In recent months, ROSENBAUER has equipped both Munich and Berlin Airport with new, mobile rescue stair vehicles. The vehicles involved represent a special, fire-fighting technology development for the rapid evacuation of aircraft passengers. Moreover, in the other direction, the staircases offer the emergency services (fire, rescue and medical personnel) safe access to the interior of the plane. The vehicles are based on original Mercedes-Benz and MAN chassis.

Suitable for all standard types of aircraft

The new ROSENBAUER rescue stair vehicles are suitable for all currently standard types of aircraft. An operational height of up to 8.30 m can be reached via the main stairs. This is the level of the emergency exits of the A380 and the Boeing 747, which at present are the world's largest passenger aircraft.

Upper rescue platform

With a width of 3,000 mm, a depth of 2,800 mm and a load-bearing capacity of 320 kg/m², the upper rescue platform offers sufficient security for the evacuation of the aircraft's passengers and furnishes the rescue services safe and rapid access to the cabin.

The high-performance hydraulics of the vehicles ensures that the main stairs can be completely run out from the storage position to their maximum height in approximately 70 seconds, which means that they are ready for operation in minimum time. Furthermore, a Level Control System (LCS) permits the pre-programming of the door heights of differing types of aircraft, thus allowing automatic docking in an emergency.

A second rescue platform at the front, which can be mounted on the original superstructure of the vehicle, which was used for winter road

services, covers heights between one and three meters.

Top safety standards

The main focus during the development of the new rescue stair vehicle was on safety in the case of an evacuation. Therefore, the width and depth of the stairs (1,500 mm/390 mm) were selected to ensure that three persons are able to descend in comfort and side by side. Irrespective of the angle of the stairs, the steps are always in a horizontal position, which allows them to be used in safety.

In order to provide a flush connection with the rump of the aircraft, the rescue stair vehicle comes to a halt at a distance of roughly 700-800 mm from the plane. The telescopic section (max. 1,000 mm) under the rescue platform then closes the remaining gap between the aircraft and the staircase in a horizontal direction and thus adapts to the contour of the fuselage with a maximum of 15° (upper platform). The lower platform can compensate for up to 10°. Distance sensors and a video camera assist this docking procedure.

Closed sidewalls and a handrail mounted above the lateral housings, enhance the feeling of security during the descent from the plane. A folding ramp at the end of the main stairs ensures a barrier-free passage to ground level and the bright, glare-free lighting also promotes safety. All the functions of the rescue device can be operated by just one person from the vehicle cab, or from the control panels on both rescue platforms.

Suitable for a range of chassis

The ROSENBAUER rescue staircase can be manufactured on chassis from Mercedes-Benz and MAN. As a result of the EURO 4 and EURO 5 exhaust gas standards, in future the chassis will be far heavier and therefore the staircases will be produced in a 3-axle version (6x6, 6x4). This will provide further advantages, as sufficient weight reserves will be available for the creation of special, individual solutions involving the transport of extinguishing agents and a pump, which will increase the operational scope of the rescue staircases.

Like all ROSENBAUER rescue stair vehicles, the Munich and Berlin vehicles dispose over a minimum range of quick attack features such as telescopic water lines with a ROSENBAUER reel complete with electrical rewind and a NEIRO branch pipe on the platform, as well as firefighting equipment such as the Fanergy fan, a generator and couplings, etc., which is stowed in storage compartments.

For further information, please contact:

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Email: press@rosenbauer.com

Dyne Technologies Is Now Offering Compressed Breathing Air Testing Services

Since 1999 DYNE TECHNOLOGIES of St. Paul, Minnesota, has set the industry standard in fire-fighting foam testing providing a turn-key system to test foam accurately and regularly – ensuring it will perform in an emergency. Dyne Technologies is now offering the same, easy, accurate and timely system to testing compressed breathing air for municipal and industrial fire departments.

Dyne Technologies can test breathing air to a variety of specifications including the National Fire Protection Association (NFPA), the Compressed Gas Association (CGA), the Occupation Safety and Health Association (OSHA) and The British Standard for Respiratory Protective Devices. This includes testing the air standard for a number of components such as nitrogen, oxygen, carbon dioxide, carbon monoxide, moisture level and hydrocarbons – making certain it is safe to breath during an emergency.

Dyne's goal is two-fold – to provide quality, accurate and precise test results and to do it using a system that makes it easy for our customers. The system includes a state-of-the-art testing kit that makes it easy for the customer to correctly take a representative sample and send it to the Dyne Laboratory in a pre-addressed, postage-paid shipping container. When the sample is received by Dyne, it is entered into a database and the customer immediately receives an electronic mail message letting the customer know the



sample has been received and when to expect the results. The sample is tested in accordance with the rigorous standards of ISO 17025:2005 "General Requirements for the Competence of Testing and Calibration Laboratories." And within two days of the sample arriving in the laboratory, a comprehensive, easy-to-understand report is sent to the customer. Dyne also sends a reminder to the customer when it is time to test the breathing air again.

To receive more information on this Breathing Air Testing Program visit the web site www.dynetechnologies.com or contact Dyne Technologies at 2357 Ventura Drive, Suite 108, St. Paul MN 55125
Tel: 651/917-0644
Email: lab@dyneusa.com



Sperian Respiratory Protection France

Sperian Respiratory Protection France, part of Sperian Protection Group, inherits more than a century of safety expertise and innovation culture. Now we are one of the breathing apparatus business leaders on the market, manufacturing disposable half-masks, escape breathing apparatus using chemical Oxygen, as long duration SCBA.

Working in close collaboration with Fire brigades, Civil Defences, Armies and Industry professionals has allowed us to put at your disposal performing reliable and latest advanced technology apparatus.

Fruit of many years of research, Fenzy X-Pro is a unique concept gathering the latest innovations for unfailing comfort and reliability in toughest conditions. It has been designed and developed by professionals for professionals to offer Firemen a Self Contained Breathing Apparatus meeting all their requirements.

Materials which compose the Fenzy X-Pro combine comfort and high performance. Resistant to hostile environments such as extreme temperatures or chemical ejections, they guarantee unrivalled endurance and lifetime.

With its new "Extreme Comfort" harness concept, Fenzy X-Pro passed the flame engulfment test as per EN 137: 2006 standard.

Its ultra light back plate includes the Easydo system allowing adjusting it vertically in 2 positions and an articulated waist belt to follow all the hip movement of the wearer.

As regards the cylinder innovative systems, the Fenzy quick-fix permits to replace them quickly and easily. The foldable and movable foot of the back plate protects the HP system.

Comfort is reinforced by the Fenzy Opti-Pro mask with full panoramic vision without optical distortion and by the Fenzy SX-Pro new first breath demand valve.

Safety is optimized by new dedicated technologies: the Fenzy Angel II multifunction monitoring device and the Angel'Metry telemetry system.

Made of two parts, the Fenzy Angel II has a unique design separating the system and the display. The weight of the display unit fixed on the strap has been reduced to a minimum, but the functions are numerous:

Automatic start when cylinders are opened, digital pressure gauge, remaining duration, automatic distress signal unit, 2 different alarms electronic and whistle, automatic self-test, temperature sensor, optional tally key, black box and radio link.

Operating between -30°C to +70°C, the Fenzy Angel II has a unique feature: In case the display becomes ineffective, the parameters and alarms are kept in the main unit. All alarms



will continue to work.

Fenzy Angel'Metry telemetry system can transmit all safety parameters of our Fenzy X-Pro: Temperature, remaining duration, pressure, Alarms...

The Fenzy Angel'Metry base station comprises different electronic devices equipped with electronic intelligence intended to transmit in real time the information shown on the display of the Fenzy Angel II device mounted on the SCBA shoulder strap to the Fenzy Angel'Metry monitoring station computer, via one or several Angel'Metry relay stations.

Depending on the distance and obstructions between the Fenzy Angel II device(s) and the Fenzy Angel'Metry monitoring station, other Fenzy Angel'Metry relay stations can be stand with supports on the ground. All of them are independent and communicate between themselves

In case of danger, it is possible to activate an individual or common recall signal from outside.

Fenzy Angel'Metry relay stations are available so that the signal is never lost between the Fenzy Angel II devices and the Angel'Metry monitoring station, even on areas where signal spreading is much more difficult (car parks, confined spaces. . .). In case of danger, it is possible to activate an individual or common recall signal from outside.

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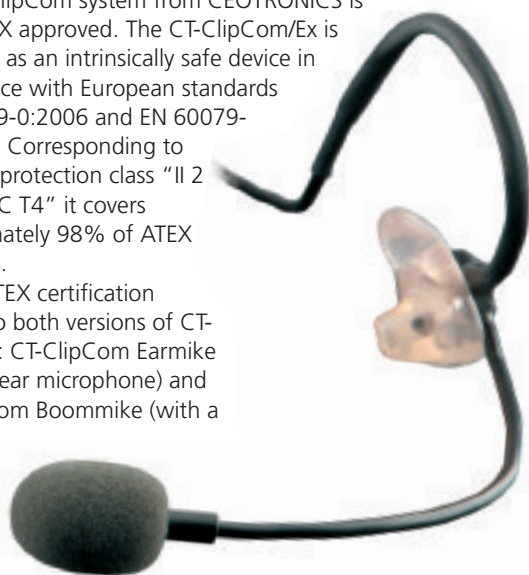
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CT-ClipCom Standard – now ATEX and type approved (PPE)

The CT-ClipCom system from CEOTRONICS is now ATEX approved. The CT-ClipCom/Ex is designed as an intrinsically safe device in accordance with European standards EN 60079-0:2006 and EN 60079-11:2007. Corresponding to the high protection class "II 2 G Ex ib IIC T4" it covers approximately 98% of ATEX scenarios.

The ATEX certification applies to both versions of CT-ClipCom: CT-ClipCom Earmike (with an ear microphone) and CT-ClipCom Boom mike (with a



flexible swan neck with an electret microphone). The boom mike version comes with the all new Flexboom which is lighter and more robust. It better keeps its shape and does not bounce back when newly positioned.

As standard both products come as monaural versions (for one ear). Optionally both products can also be obtained as binaural communication systems (with speakers for both ears).

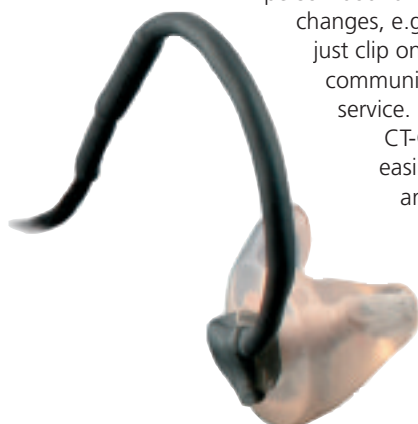
Additionally CT-ClipCom Earmike has just been EC type approved as a hearing protection (PPE) in accordance to EN 352-2: 2002. That pleases all those that until now had to wear heavy sudorific earmuffs. Connected to a two-way radio the ultra light CT-ClipCom is just plugged directly into the ear – your hearing is now protected. The PPE for CT-ClipCom Boomike will follow shortly.

A lamellar type earplug with high wearing comfort, a standard silicon earpiece or an individually molded silicon earpiece is just clipped onto the speaker housing. This makes CT-ClipCom a very flexible communication solution as is it not person-bound. If the personnel

changes, e.g. during shift work – just clip on a new earpiece – the communication set stays in service.

CT-ClipCom is set up easily within seconds and at the same time a cost effective communication equipment.

On top of that CT-ClipCom is also equipment independent. It is neither tied to any



helmet or protective clothing nor does it obstruct any PPE. CT-ClipCom is the perfect audio and protective device to be used in connection with helmets, SCBA (self contained breathing apparatus) or protective suits.

Also regarding hygiene issues CT-ClipCom complies with the highest standards. As earpiece and communication electronics can be separated from each other in seconds, not everybody needs his/her "own" system. The earpieces can just be cleaned under running water.

The earmike version of CT-ClipCom offers a tremendous advantage when used with heavy SCBA equipment as the speech is picked up in the ear channel and no disturbing operating noise of the breathing apparatus is transmitted.

The CT-ClipCom is available with connector to all major analog and digital two-way radios.

For further information, please contact:

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or visit our website www.ceotronics.com

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Lincolnshire Fire & Rescue become the first to adopt ICP Contract for Firefighter PPE and Stationwear

Following the signing of the ICP contract between Firebuy and Bristol Uniforms in May, Lincolnshire Fire & Rescue have become the first fire service to adopt the new national identity with the purchase of PPE and station wear.

The initial requirement will involve the supply of the Pbi Gold™ structural two piece fire suits along with a range of station wear in the new red and grey combination chosen for the national identity for the fire service. The contract also specifies fleeces and waterproofs from the ICP range which will be adopted by the 750 strong team at Lincolnshire Fire & Rescue. It is now expected that the comprehensive range of operational and non-operational PPE and work and corporate wear will be progressively introduced to other fire and rescue services across the country over the coming months as existing contracts expire.

The contract calls for two sets of PPE for each firefighter, which, along with the station wear, makes up the first order which was manufactured over last few months and delivered for its introduction in February.

Commenting on being the first fire service to adopt the new national identity, CFO Mike Thomas said, "Having been involved in the development of the ICP Project I have been impressed with the rigours in procurement and in particular the robust and extensive garment trials and the development of the national identity clothing. I am pleased we have been able to place an order against this high tech specification and look forward to seeing my operational firefighters protected to the best standards available with clothing that is clearly fit for purpose, suitable for all staff and, above all, presents a positive image of the modern fire and rescue service."

Bristol Uniforms' joint managing director, Ian Mitchell, added, "Bristol uniforms has worked hard alongside Firebuy to bring to fruition a range of clothing for the fire and rescue service which, through its design and colour combinations, provides, for the first time in its history, a national identity. We are naturally delighted that Lincolnshire has become the first FRS to take advantage



of the benefits available under the Integrated Clothing Project and will be starting to establish this identity amongst the public following the national launch in Lincoln Cathedral today, March 30th. The Company is proud of its achievements and the contribution it is making to help build a new and fresh identity and image for the fire and rescue service. This, and the state-of-the-art technical specification and performance characteristics of the PPE, reflects an organisation whose front line firefighters and support staff are suitably clothed and protected to meet the challenges faced daily by a 21st century fire fighting organisation".

IFF

For more information about Bristol Uniforms please contact either:

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bristoluniforms.com or

Richard Storey

RSL Associates
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SCBA – Modularity Holds the key to the future

By Greg Barber

Product Specialist,
Draeger Safety UK
Limited

The last 10 years have seen some remarkable developments in self-contained breathing apparatus (SCBA). Improved ergonomics and enhanced materials have made their mark as has the introduction of lightweight cylinders. However, the emphasis has now shifted from improving a particular element to looking at the respiratory and head protection system as a whole. The evolution of a complete system solution has brought improved communications to the fore as well as thermal imaging, head up displays and, of course, electronic monitoring telemetry.

In a world where firefighters can be faced with terrorist attacks, natural disasters and environmental catastrophes from one day to the next, SCBA has evolved to become a series of essential components that can be mixed and matched to provide an integral system that meets the exact needs of the task at hand. This modularity also means that future upgrades are easier and more cost effective to achieve.

Recognising that no two “shouts” are the same and that the hazards are diverse in nature as well as in their extremity, firefighters are relying on their SCBA to offer far more than a “breath of fresh air”. They want to know that the system can stand up to arduous conditions and that it offers the highest levels of protection. They also need to be confident that, wherever danger may lie, the

SCBA will prove to be a valuable ally, relaying essential data back to entry control and providing vital communication right when it is needed.

User comfort and performance

Designed to offer uncompromising, all round protection in the most extreme situations, these systems should also boast comfort, performance and ease of use at their core. As a result, they have become lighter and more compact, without losing any of their rugged design and strength in composition.

For instance, the burden of weight on the back is something that every firefighter has to contend with. Several years ago and following studies with the Rotterdam Fire Brigade to determine the most effective method of weight distribution and body mounting of BA sets,

Pic courtesy of Draeger Safety UK Ltd



Draeger found that it was able to significantly reduce the likelihood of back injuries. Not only that but, by reducing the stress on the body; breathing rates are potentially lowered, safety would also be increased. In addition, following careful consideration of a study of anthropometrics, Draeger also added a 3-point height adjustment feature to the backplate – a move that ensured that it met the needs of at least 95% of UK firefighters.

Improvements have continued and, recognising that BA is worn in dynamic applications where firefighters are required to move, bend and stretch, a sliding/pivoting waistbelt was introduced to ensure free movement and allow for up to 80mm of spinal stretch. Knowing that the average firefighter is required to carry 3 kilos of com-

pressed air alone, cylinder weights were also reduced with the launch of carbon composite cylinders in different formats and configurations to suit different requirements.

More recently, harnesses have been fitted with advanced, compression moulded comfortable padding that combines high temperature performance with exceptional wear resistance. High grip, anti-slip surfaces have also been added to ensure that the harnesses stay in position and the sets remain secure on the body.

In addition, quick release mechanisms have been introduced on the first stage pressure reducer as well as the waistbelt and shoulder harness to allow fast, simple detachment for easy cleaning and maintenance. Adjustable, heavy duty stainless steel strap buckles have been added to ensure long life and easy operation when donning and doffing. As an essential component, the hoses have also been given extra attention and are now being housed in reflective sleeves that increase visibility whilst providing additional protection and minimising the risk of snagging.

The effortless assembly and disassembly of all the major components means that not only can sets be configured rapidly but easy care and maintenance will guarantee quick turnaround times in the workshop and, as a result, ensure that the SCBA is always ready for use.

Ergonomic full face masks which are compatible with both the SCBA and firefighting helmets now boast a double seal to ensure a secure fit that feels both comfortable and natural to wear. Available in a wide variety of sizes to suit men and women as well as different face shapes, the mask body can also be supplied in either a hypoallergenic Silicone or EPDM to

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suit individual preferences. Designed to maximise air circulation within the mask and eliminate misting, the better systems also feature distortion-free, thermally protected polycarbonate visors and are offered with a number of different coatings to combat every type of hazard.

Uncomplicated 5-point head harnesses have replaced the more old-fashioned models and, for those who prefer to use mask-helmet combinations, new connections have been designed that allow face masks to be quickly and securely connected to the helmet. The stability of the design is essential as no firefighter will want to find that a knock on the helmet has dislodged the face mask and he or she has lost breathing air as well as communication. Together with the very secure Draeger Q-fix 2-point helmet connection, the Draeger FPS7000 face mask, for instance, can be supplied with a new, integral FPS-COM communication system which can be easily adapted for radio communication or voice amplification.

Face masks such as these can also be fitted with head-up displays which can be quickly and easily inserted or removed to suit specific requirements. Protected from the ambient atmosphere and featuring wireless designs, they allow firefighters to view their real-time cylinder content automatically, leaving their hands free for other tasks. Whilst easy to see, they are also designed to be as unobtrusive as possible, leaving the firefighter free to concentrate on the task whilst safe in the knowledge that essential information will be flagged up clearly.

However the future of BA does not just lie with modularity and the ability to upgrade easily in the future, it is also essential that the provision of information to the firefighter and entry control continues to improve.

The importance of good communication

The more a firefighter knows, the more chance he or she stands of avoiding or dealing with danger. As well as the more obvious applications of search and rescue, thermal imaging cameras can be used to film and save pictures or video sequences which can then be viewed by colleagues before re-entry,

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*Pic courtesy of Draeger
Safety UK Ltd*



etc. When using a specially designed transmitter handle, they can also allow firefighters to send infrared pictures from the camera to one of three optional receivers. If used in conjunction with SCBA electronic monitoring and telemetry, this level of communication significantly improves firefighter safety, particularly in entry control situations.

Designed to provide continuous monitoring of



*Pic courtesy of Draeger
Safety UK Ltd*

the operational status of both the firefighter and the SCBA, electronic signal and warning units have enabled telemetry to become a powerful ally in any response involving the use of SCBA.

Simple, user-friendly push button controls are used to provide fast access to essential information with the Draeger Bodyguard PSS 7000 electronic monitoring unit, for instance. Incorporating a highly visible LCD display that provides accurate and continuously updated data in an easy to read format, it includes time-to-whistle, which is calculated on current air consumption and is refreshed every second, and displays digital pressure reading in bar together with a simulated analogue gauge and temperature indication. With integral ADSU and Distress signal alarms, it also performs automatic self tests and system tests and emits both visual and acoustic alarms which cannot be missed in either noisy or dimly lit environments.

Each unit can be programmed to identify the user and/or Brigade automatically. Prior to use, the user simply uploads his or her personal ID, wirelessly, using a personalised pre-programmed ID card. Parameter settings and datalogging can also be performed easily via a wireless link to a PC interface module via standard USB connection.

When coupled with telemetry in an entry control application, this sophisticated level of information interchange means that the monitored data can be viewed externally in real time. Designed to equip entry control officers with essential knowledge, it can show just what the firefighter has come up against, how quickly he or she is breathing and whether or not they have stopped moving. As a result, it takes the guesswork out of entry control procedures, enabling the right decisions to be made about particular firefighters as well as rescue teams.

The transponder based control board meets the requirements of TB1/97 and JCDD40 and is based on the standard UK control board with additional electronic displays. Fully automatic and able to support rapid deployment procedures, it provides

one continuous display channel for each firefighter simultaneously, with full manual back up if required.

Firefighters log on by inserting the tally into the control board. They are then allocated a specific channel and two-way communication is established immediately. Each channel displays an on-line signal, ADSU alarm signal and evacuation and withdrawal signals. These signals can be given, received and acknowledged by the BA wearer or Entry control officer.

The time to whistle, time of whistle, cylinder pressure or temperature, etc, can be selected and viewed outside the incident by the entry control officer according to requirements. Individual or group evacuation commands are also supported by a separate voluntary withdrawal facility and, in the event of a radio signal being lost, audible and visual warnings will be issued to all those concerned.

Gain without pain

Whatever the addition in terms of technology, it is important that the "vital statistics" of the SCBA are not increased. The goal has to be to improve the functionality whilst reducing or maintaining the overall weight and size of the equipment. For firefighters, every gram of added weight could increase fatigue, lead to further strain and reduce manoeuvrability. Similarly, the profile and bulk of the SCBA should remain as streamlined as possible to minimise the risk of entanglement and entrapment. A low profile design will also help

to maintain balance and minimise changes to the centre of gravity – something that is particularly important when working on ladders and during search and rescue missions.

Effective training is the final component and should cover the selection, use and maintenance of SCBA and all its associated equipment. Preventive maintenance will not only ensure a firefighters' safety whilst wearing the set but it will also ensure compliance with the appropriate regulations. User training will help to improve overall performance and increase confidence whilst emphasising the limitations of SCBA to ensure that firefighters do not enter situations where their equipment will not provide adequate protection.

Improper use or modification of SCBA could have negative consequences too and all users must recognise the potential problems. For instance, a cylinder that has been dropped, burned, submerged, run over or exposed to chemicals should be purged and thoroughly examined and tested by qualified repair personnel before it is used again. In a similar vein,

SCBA that has been subjected to extreme levels of uses should be tested and maintained at more frequent intervals.

As manufacturers of a wide range of SCBA and associated equipment, Draeger offers a wide range of training courses covering all aspects of firefighting. These include everything from the use, selection and maintenance of BA, through to working in confined spaces, gas detection and the use of chemical protection suits. **IFF**

Further information is

available from:

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Marketing Manager,
Red Box Recorders

At Red Box Recorders we work with a number of the fire services such as East Sussex Fire & Rescue and Highlands and Islands (Inverness) Fire & Rescue, providing voice recording systems for each authority to monitor communication between them and the public including emergency (999) calls and command and control (airwave radio) communications. As a result we understand the specialist requirements of UK emergency services contact centres, and the challenges they face in choosing the right voice recording systems.

Risk assessment

One increasingly common requirement is the ability to assess community risks by using the data collected to analyse particular areas of a town or region that are more at risk of fire. This is based on information about occupancy characteristics and previous fire incidents which can then be used to develop local fire prevention initiatives.

One tool that can help in this process is a quality management solution, integrated with a voice recording, retrieval and storage system.

By consolidating and automating everything in a single, easy-to-use interface this enables organisations to assess, measure and report on data that is based on audio records, screen information

and associated data events. In fact the system can help measure any aspect of the organisation and allows assessment forms to be customised for the specific area or process that needs measurement/management. It is a simple matter of creating a template (a set of questions relevant to the function) to allow measurement and assessment of the relevant data. These templates are built once and can be edited as needs change, with topics and questions simply added, and imported into each scoring session.

Legal requirements

Emergency Services have an operational requirement to record and store all emergency and non emergency calls with a number of reasons for



doing so which include:

- 1 Evidence.** 999 calls are sometimes used as evidence in a criminal prosecution and their clarity and integrity are key.
- 2 Disclosure.** Anyone who calls an Emergency Services call centre has the right to hear their call. Recordings can be used to clarify what was said, when and how.
- 3 Protection and dispute avoidance/resolution.** Protecting your organisation's interests by proving 'who said what' in a dispute can be vital, saving time and money. The Emergency Services can experience high levels of complaints with potentially serious implications.
- 4 Staff training and development.** Recording and monitoring calls is one of the best ways to train and coach staff on how to handle calls effectively.
- 5 Compliance.** There are strict policies and procedures regarding things such as dealing with pranks, quiet calls and timewasters.

The technology

In the past, traditional voice recording systems have been technology heavy requiring considerable involvement from IT departments, but the majority of public sector organisations have ever shrinking IT resources that are massively overstretched. If this sounds familiar, make sure you consider areas such as the storage of audio back up when you are looking at options. With many suppliers it often involves IT intensive processes, with a lot of manual intervention – all of which has time and cost implications – so look at how much IT involvement is needed for the day to day management of the system and also what happens if something goes wrong.

The Red Box solution utilises a unique technology offering with a single software based system that can be implemented modularly, meaning excellent budgetary control. It is completely web-based for ease of use and fast roll-out and its simplicity means that it can be managed by operational personnel rather than the IT specialists. Customers can use their own hardware and operating system to maximise buying power if they prefer, or opt for full turnkey solution for simplicity of procurement and support.

Specialist requirements

There are a number of key technology challenges that are specific to the Emergency services. For example, the requirement for all audio and associated meta data for every call, so that evidence

can be located quickly and will correlate with other terms of reference and evidence. Many systems in the market will store records in two separate locations. This means that both have to be backed up and restored and IT have to understand how to do this. This is no trivial task and runs the risk of losing essential reference materials that make finding calls achievable. Ideally solutions will offer a simple single process that stores both audio and data together, meaning the built in archive process and or backup take care of the whole job. The restore process should be achievable by the system user and should not need involvement from IT.

Another key purchasing consideration is whether the technology ensures that the recordings already made are safe and offer integrity of the data so any changes to configuration are not inflicted on historical data – most systems do, and that causes all sorts of problems for evidential disclosure.

Preparing for the future

Finally, as with all new capital investment it is important that any solution you purchase is as future proof as possible. Scalability is a must as your system needs to be able to adapt as your organisation grows and enable changes of interface as your telephony and radio systems change. You should also be able to add functionality as

Scalability is a must as your system needs to be able to adapt as your organisation grows and enable changes of interface as your telephony and radio systems change.

and when you require it such as audio analytics, quality management and screen recording, which will allow you to fulfill requirements from the different functions and operational needs across the organisation, with the same core investment.

Conclusion

Every day call handlers within the Emergency Services sector are dealing with life and death situations. Call handlers for the fire service provide an essential link between members of the public needing assistance and the emergency teams. They are responsible for the immediate dispatch of crews and appliances along with any specialist equipment that is required. They deal with many thousands of calls every week covering a variety of events such as fires, road traffic collisions, incidents involving hazardous materials, flooding and many others. They are often acting as part of a wider emergency services team and have to provide evidence and supporting information alongside the other services for joined up investigations.

In addition they are under huge pressures to perform statistically and qualitatively under demanding conditions and strict budgets. There is no doubt in my mind that having the right voice recording solution can play a major role in supporting this vital work.

IFF

About Red Box

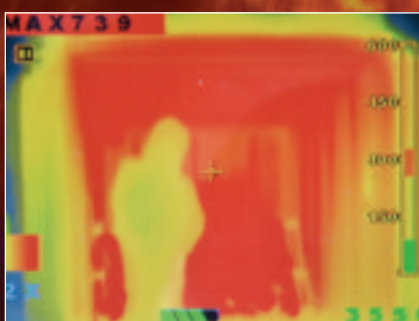
Red Box is a specialist in digital recording – voice recording and data capture, storage, retrieval and analysis. Its products are used in highly focused market solutions, mainly for the emergency services, financial institutions and contact centres.

Its integrated quality management solution, Virtual Observer, enables contact centres to assess, measure and report on operational performance based on audio records, screen information and associated data events. It also incorporates e-learning, coaching and supervisory applications for monitoring and assisting staff.

Virtual Observer silently monitors the conversations and the screen activity of an individual in real time, as well as for post-operation analysis. Supervisors can help users by taking control of their PC to complete functions, provide guidance or send them information and notes.

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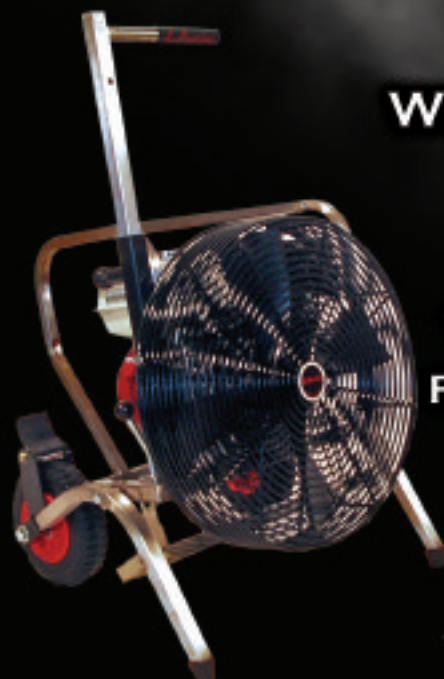
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PPV Technology to ventilate large structures

By Roger Weinmeister

Super Vacuum Manufacturing Co., Inc.

It may be clear by now that Positive Pressure Ventilation (PPV) is one of the most powerful tools in any emergency department's arsenal. Ventilation is essential not only for reducing property damage after the fire is extinguished, but even more importantly for improving life safety for both the firefighters and any victims of a blaze.

PPV is also very helpful in ventilation operations not involving fire, including Hazardous materials and terrorist actions. Until now PPV was mostly applicable in house or garage fires, but as fire fighters become familiarized with the technique and started seeing the advantages, they realized that PPV could be helpful in ventilating large structures, like warehouses, tunnels or high rise buildings. Especially in large structures smoke causing lack of oxygen, loss of direction, and heat are all critical factors contributing to the amount of casualties. PPV can help in reducing them.

For this need some manufacturers have developed large (>1 Meter in diameter) fans. A large, powerful ventilator is able to displace huge amounts of air. These large fans can be mounted either on a trailer or on a dedicated fire truck. The fan is placed on a rotate-able head and able to take on the needed angle for optimum placement. By creating large volume of air moving at high speed, firefighters can better control the environment in large structures.

Using a fan to blow into a structure defies most sound firefighting theory. But it was found that the air did not have a significant effect on fire behavior. It is important that an exit point for the air must be opened prior to starting any PPV operation. It is also important in fire situations that hose lines are deployed simultaneously with or immediately after the airflow to the seat of the fire. Similar to a typhoon, oxygenated air is drawn in low and heated combustion products are expelled upward. The fan, if set right next to the seat of the fire would greatly increase combustion. But when air from the fan expands to fill the space, the wind speed is reduced. This causes the smoke and heat to be moved away from the fire source without significantly increasing the size of the fire.

When deploying a large fan, consider wind direction, and downstream safety prior to setting up the unit. Furthermore, always vent from the attack side, failure to coordinate the ventilation with fire attack can have serious, negative consequences. Wind

Pic courtesy of Super Vacuum Manufacturing Co., Inc.



plays a big role in how effective PPV technology is utilized. In general, PPV will be very effective in wind speeds up to 20 kph. In higher wind speeds, it is best to use the wind to your advantage. Just as wild land firefighting is not done from the downwind side and this is also true for large structure ventilation in high wind. As wind speed increases, it is best to make smaller exit openings or to move air at angles to the wind direction. It is physically impossible to overcome high natural wind speeds with a large fan.

In large fire structures like tunnels, casualties can be reduced if smoke inhalation and loss of direction can be eliminated. Smoke and heat created in a tunnel are difficult to deal with, as they limit the possibility of reaching the seat of the fire, as they

are billowing out of the tunnel. With a tool as large fans it is able to have enough capacity to displace so much air that smoke and heat can be solved, and making it relative easy to put water on the fire. The fresh air that is blown into the tunnel lowers the chance of smoke inhalation dramatically and lowering the temperature allows casualties to sustain longer. It also increases the sense of direction where fresh air is coming from, allowing self rescue of victims that are capable of moving. It is this ability to aid in self rescue that significantly increases the fire departments effectiveness in large scenarios. The effort and manpower required to search, locate, and remove victims is greatly reduced.

Large fans are also useful in high rise incidents. For high rise buildings the most important aspects is to maintain the conditions of stairwells, which is ideal application of PPV. Stairwells are the main arteries of high rise buildings. They are the means of egress for the occupants and the means of ingress for the rescue personnel. Many buildings have pressurized stairwells built into them. The use of PPV can assist in this pressurization or perform the task for systems that are not functioning due to fire conditions. While ordinary PPV fans are useful in buildings up to 3 stories, large fans are useful up past 30 stories.

The number and type of building that can be successfully ventilated with large fans is very high in most areas. Large retail outlets and warehouses are usually protected with good sprinkler systems that minimize heavy fire conditions. But many of us have been on responses to these buildings where the fire was effectively contained by the sprinkler system, but the building was filled with smoke. These cold smoke (smoke that is not thermally stratified) conditions

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can be very difficult to ventilate without large fans. The use of large fans can allow business owners to quickly get back to their business, while firefighters can be freed for the next incident.

The application of a large ventilator is not limited to fires. In situations where a building is contaminated due to hazardous material spills or terrorist actions, PPV can be used to blow fresh air into a building. This type of dilution is the most effective method to make the building safe for use. Large fans with water misting systems can be effective in certain situations where it is safer for the responders and public to change the contamination from airborne to waterborne. Hazardous materials situations are most always difficult and time consuming, the ability to use a large fan can make them easier and quicker to mitigate.

When specifying a large fan, it is wise to consult with different people within your department. Many times the people on the High Rise Building team are not the same as the people on the Haz-Mat team. However both groups could benefit from being able to dispatch a large ventilation unit to their scene. In some mid-sized departments, it may work best to have a unit that is shared between a number of departments within a mutual response zone. A large ventilation unit is like an aerial ladder; it is not something used or needed every day. But when the situation arises, it is the only truly effective way to handle the rescue.

Once you have decided what your department needs are regarding the unit, it is time to specify what you would like to purchase. These large fans can be mounted either on a trailer, as part of a multi-purpose vehicle or on a dedicated fire truck. The fan can be placed on a rotate-able head and able to take on the needed angle for optimum placement. These units are usually powered by petrol, diesel or hydraulic motors in sizes ranging from 30 Hp, up to 500 Hp. Petrol units have the advantage of being lighter in weight and therefore easier to lift and position. The disadvantage of petrol units is they require a separate fuel source. Diesel units have the advantage of being able to use the vehicle fuel source and common operation of most large fire vehicles. Diesel unit are generally of a higher weight and cost than petrol units. This higher weight limits the ability to lift and position diesel units and prevents them being mounted behind the rear axel on most fire vehicles. Hydraulic units are the lightest of the three options and can operate in any orientation (from straight down, to straight up). They also can operate via the power-take-off (PTO) from the vehicle engine and fuel sys-

tem. The disadvantage is efficiency (engine to hydraulic motor is usually 50-60% efficient) and most PTO's have a limit of 50 Hp.

Once a proper unit has been specified it is time to train the trainers so they can instruct the firefighters. There are many times, with changing personnel and priorities that departments do not fully utilizes the resources they have purchased. While the basic concept of a fan moving air is well understood, the knowledge of how to successfully use a large fan to save victims in a variety of situations is not as easy to understand. There are many good sources for information. A very good place to start is the NIST (National Institute of Standards and Technology) site at www.fire.gov/PPV/index.htm. The NIST team, lead by Stephen Kerber, has been studying fire behavior and the effectiveness of PPV in an informative and balanced approach. Additionally, their work references many good sources of information that can help with a solid overall understanding of successful ventilation practices.

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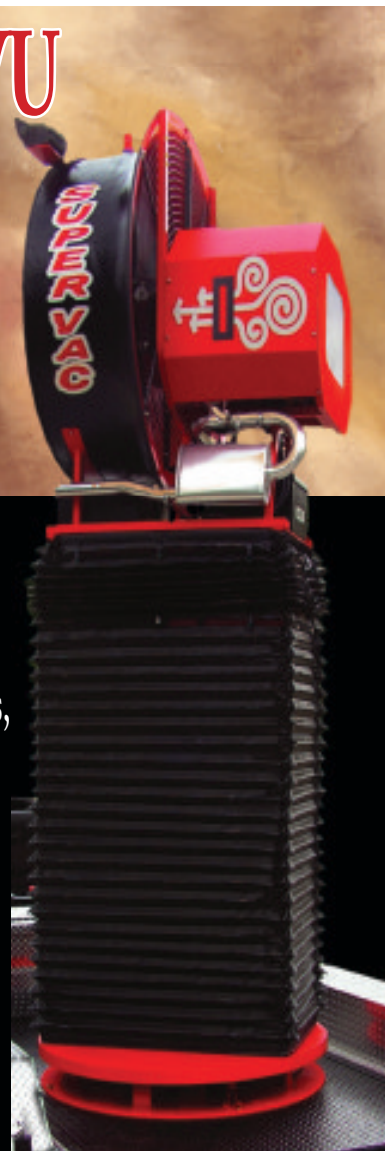
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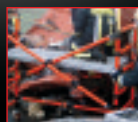
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Selection process of extrication tools

By Paul Gunnels

The average citizen is normally amazed when observing emergency responders using tools to untangle and dissect twisted metal and other vehicle components to extricate victim(s) of a motor vehicle accident (MVA) because it looks so perfect. All firefighters that have worked motor vehicle accidents to extricate victim(s) know that this is so far from reality because each incident has its own major challenges and none are the same.

How does the emergency responder know what tool to select during victim(s) extrication from vehicles involved in a motor vehicle accident? In order to answer this question we have to start by covering the basics of vehicle extrication. Basic vehicle extrication does not just cover extrication tools but must also include safety, patient care and vehicles design.

Safety

Over the past 22-years of my fire service career many emergency responders have been injured or worst killed while working emergency scenes though out the nation. Fortunately I have not been on scene of an MVA where an emergency responder was injured. I have been at emergency scenes where distracted drivers have almost struck fellow emergency responders. I cannot express how important it is to understand and develop safety procedures for all roadway emergency scenes to protect the emergency responders and

measures should be implemented to assure the scene is safe by using other emergency vehicles to protect emergency responder work areas. Responders using Class III Highways Safety Vest provides an increased visibility for workers and NFPA 1500 complaint reflective signs warning of "Emergency Scene Ahead" can provide some added safety for workers. When operating tools all emergency responders should wear proper protective equipment to meet their organizational policies and manufacture recommendations when operating equipment.

Vehicles

Basic vehicle knowledge for emergency responders should focus on vehicle construction materials, vehicle anatomy, and internal designed safety features. Understanding construction materials helps emergency responders select the proper tool and the best method to dissect the material. Vehicle anatomy is important for emergency

Protecting emergency responder work areas can be challenging because every incident is different and brings its own unique hazards. Emergency scenes at nighttime and during inclement weather conditions will decrease safety and all measures should be implemented to assure the scene is safe by using other emergency vehicles to protect emergency responder work areas.

victim(s). The most important tool you will always need at every emergency scene is your brain. Using your knowledge and experience will help increase your situational awareness to protect the work area for responders during emergency scenes. Protecting emergency responder work areas can be challenging because every incident is different and brings its own unique hazards. Emergency scenes at nighttime and during inclement weather conditions will decrease safety and all

responder's communications to having a common terminology during vehicle extrication. All internal designed safety features for passengers are hidden dangers for emergency responders during extrication operations.

Vehicles traveling on today's roadways are constructed of steel, aluminum, magnesium, composite, glass and foam or any combination of these materials. Older model vehicles tend to be constructed with heavy metals such as steel while

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newer compact vehicles tend to have lighter weight materials. Compact vehicles weight around 3,500 pounds while SUV's tend to be about 6,000 pounds; this provides an idea of the difference mass between these types of vehicles. Compact vehicle tend to have a unibody frame while the heavier SUV's have a steel frame design. There are hundreds of body styles, models, and design features on the roadways. Not every emergency responder will be able to learn every one, but having a basic knowledge of vehicle design and construction materials will provide a basis to build upon during vehicle extrications.

Understanding vehicle anatomy is important to having a common terminology among emergency responders. Basic knowledge used to identify vehicle components like; rocker panel, A-Pillar, B-Pillar, C-Pillar, roof, steering column, strut tower, and frame types. Most extrication books provide diagrams of vehicle design of different vehicles. These diagrams can also be obtained on the Internet. Speaking from experience having the knowledge of vehicle anatomy before motor vehicle accidents occur will help you determine what you're looking at after the accident happens. Sometimes after a vehicle is involved in high speed MVA it takes a few seconds to determine what part of the vehicle you're looking at and identifying vehicle type. Understanding vehicle anatomy will provide emergency responders the knowledge to determine where the extrication efforts should start.

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Airbags are engineered internal safety features designed to protect occupants in a vehicle during a MVA. These types of safety features might be safety features to protect occupants but they can be dangerous to emergency responders. With newer designed vehicles these airbags can be located in the dash, steering wheel, seats, pillars, head rests, roof, and floor-board. Many instructors teach that airbags can be made safe by disconnecting batteries and putting protection devices are to restrict airbag deployment. I don't agree with these choices if you have other options. Some newer vehicles have batteries underneath the rear seats or in the trunk areas where emergency responders may or may not have access to these areas after an MVA. Disconnecting batteries doesn't confirm airbags will not deploy because by devices such as portable electronic devices being plugged into the vehicle's 12-volt system can

possibly back feed enough energy to activate the airbags within the vehicle. I believe that emergency responders should avoid airbag deployment areas and be diligent in looking for hidden airbags before starting extrication operations. Searching for airbags needs to be focused in areas where emergency responders will be cutting during extrication operations. One technique is using a small tool to remove all plastic covering of pillars and rooflines to find airbag location. The reason this procedure needs to be preformed is to avoid cutting any type of canisters, cylinders, and inflator devices used to activate airbags. These types of devices can either have stored energy or high pressure that could injure anyone within the vicinity by its unexpected activation and/or fragmentation of metal.

Extrication tools and methods

All the information that has been covered in this article to this point provides the knowledge that is needed before any tool can be selected to use during extrications. Selecting tools for extrications

As a firefighter I have seen emergency tools that just don't live up to the demands of emergency operations.

When selecting tools for emergency operations emergency responders must consider many aspects from tool performance, parts availability, and maintenance.

is not as easy as it might sound. Some tools can be purchased at your local hardware store while more specialized extrication tools will have to be ordered from dealers and distributors. Before selecting a new tool for purchase a review of current departmental extrication capabilities should be completed. Reviewing capabilities provides the information needed to decide what new capabilities are needed to meet organizational needs. The focus will be on vehicle stabilization and extrication tools in different type of methods.

Every organization has limited funding this is why emergency responders have to become more knowledgeable and selective in purchasing tools. As a firefighter I have seen emergency tools that just don't live up to the demands of emergency operations. When selecting tools for emergency operations emergency responders must consider many aspects from tool performance, parts availability, and maintenance.

Using such programs like System Assessment and Validation for Emergency Responders (SAVER) reports offered by U. S. Department of Homeland Security (DHS) provides detailed information about equipment before purchasing. The SAVER program is used to provide first responders an impartial

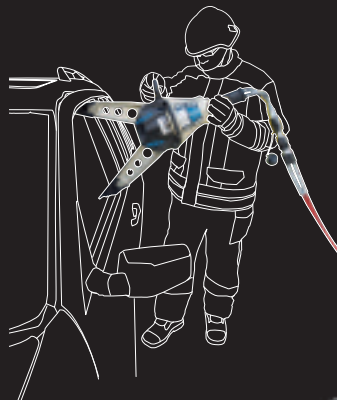
opinion on equipment in the following areas deployability, affordability, dependability, maintainability, and usability. These tests are performed in a controlled testing environment by experienced emergency responders with extensive knowledge and skills from all over the nation. This is a great tool to use to get added information to making the selection of tools. This information is available at <https://saver.fema.gov> for review.

Vehicle stabilization should be a priority before the extrication operations begins especially when vehicles are not on their wheels. There all several types of commercial vehicle stabilizing equipment systems that can be rapidly deployed to stabilize a vehicle on its side or top. Once the vehicle is stabilized to protect emergency responders and victim(s) vehicle extrication operations can begin.

A complete set of hydraulic extrication tools includes; a power plant, hoses, spreaders, cutters and rams. These tools are the most expensive investment for organizations that are used to untangle and dissect metal of vehicles involved in motor vehicle accidents. The majority of vehicle extrication only needs a door to be opened to extricate the victim(s) to prevent further injury.

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When using tools to extricate victim(s) the practice should always be to minimize damage when possible if it doesn't compromise patient care. When time is of the essence for patient care, the focus should be to remove the vehicle from the victim(s) in a systematic manner in order to free the victim(s) in the safest and fastest operation.

When gaining access to victim(s) by opening vehicle doors other than normal means by emergency responders, normally you only need hydraulic spreaders and cutters to remove the doors. Spreaders are used to "Pop" the door from the nader pin side of door to gain access to victim(s). When a door is opened in this manner the cutters can be used to cut the hinges, just avoid cutting directly on the hinge pin. These tools can also be used to "Roll" the door from the hinge side. The majority of vehicle extrication that is done after a MVA is to only open or remove the vehicles door(s) in order to extricate the victim(s).

During extrication operations when removing the roof from a vehicle normally the use of hydraulic cutters is the only tool needed to cut all

victim(s) from motor vehicle accidents. Air chisel with an assortment of bits provides emergency responders the method to dissect lightweight sheet metal to gain access. One inch tubular webbing about 10 feet long can be used to tie to brake pedals and pulled across the steering column to provide an elevated point to lift from which gains enough space to extricate the victim(s) feet from beneath the pedal.

Summary

Using the knowledge within the article to start the research needed to find classes that cover these topics would provide information for your organization. Safety is a topic that must always be kept in focus. Safety during emergency scene focuses on protection of emergency responders, victim(s), vehicle safety features and tool operations. Vehicle construction and material compositions is knowledge that is needed in order to select the proper tool during extrication operations. Selection of the proper tool starts by researching your organizations current capabilities

Vehicle extrication is a skill that organizations will have to expose emergency responders as much as possible to different type of tools and vehicle. As individuals get more exposure to tool operations with the dissection of different vehicles the organization begins to develop subject matter experts that can start instruct internal classes to make their responses safer for everyone.

pillars to allow the removal of the vehicles roof. During this operations caution should be to check behind the plastic that covers the interior side of pillars for airbag deployment devices. The front windshield will have to also be removed with either a special glasscutter or fire axe because it's a laminated glass is different than safety glass, which is used on all other windows. Cutting Pillar's of newer designed cars with hydraulic cutters may not work on these reinforcement areas, in these situations a reciprocating saw with a metal cutting blade having between 10 to 14 teeth per inch will cut the metal. The metal blades with 10 to 14 teeth per inch are better for vehicle extrication because the blades last longer and will cut metal and plastics.

Dash Rolls and lifts are more complex because you will need an extensive knowledge of vehicle design and construction in order to determine which method is best with each MVA. Tool operators during these operations must have a vast knowledge of the tools capabilities and limitations to get the dash moved to extricate victim(s) from the vehicle. This is a skill that takes lots of practice in order to master.

Miscellaneous extrication tools used to extricate

and determining needs. Using programs such as SAVER to help in providing unbiased information about tools before making purchases may save your organization money in the long run. Stabilization of vehicle is a safety concern that must be confirmed before extrication operations can start. Vehicle extrication has many tools that can be selected to do different type of methods to gain access to victim(s) for extrication. The best tool to bring to every emergency scene is your brain. The best method for extrication operations will really depend upon the vehicles condition, design, access points to victim(s) and tools on scene.

Using this information with hands-on classes, where tools are used will provide emergency responders the working knowledge and opportunity to develop skills in vehicle extrication methods. Vehicle extrication is a skill that organizations will have to expose emergency responders as much as possible to different type of tools and vehicle. As individuals get more exposure to tool operations with the dissection of different vehicles the organization begins to develop subject matter experts that can start instruct internal classes to make their responses safer for everyone.

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Stand and Deliver – The role of fire monitors

By Peter Kristenson

Senior Manager,
Product Management
Team, for SKUM foam
hardware at Tyco Fire
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While fire monitors spend the vast majority of their lives motionless and lifeless, when the call to action comes, their effectiveness can easily be all that stands between recovery and disaster. Far from being ancillary equipment, they are a “front line” firefighting resource, particularly in volatile high-hazard environments. Peter Kristenson explains.

In essence, there are two types of fire monitor. The first type is the fixed monitor; a static monitor that is attached permanently to pipework and is positioned to stand guard over a specific fire risk. This is most often a high-hazard Class B fire risk that involves flammable liquids such as petrol and diesel, as well as solvents, lubricants and spirits. The second type is the mobile monitor. While these are used to tackle the same Class B fires, traditionally they have most frequently been employed to protect a multitude of fire risks. As the terms “mobile” implies, they are trailer mounted for fast deployment around the site so they do require a water supply, which is usually provided by hose connection to a hydrant or portable pumps.

The decision to install fixed monitors or opt for portable equipment is not as straightforward as it may first appear. Undeniably, a fixed monitor has the potential to be brought into action on a particular fire risk faster than a mobile unit that has to be moved and connected to a water supply. However, a major petrochemical fire, for example, is often preceded or accompanied by an explosion that has the potential to disable or destroy the fixed equipment before it has even had time to spring into action. So dependency on fixed monitors can be a high-risk strategy.

Conversely, reliance on mobile monitors inevitably means some delay before firefighting can commence. It is also imperative that all of the



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site's possible fire scenarios are carefully assessed so that this delay is not extended while, for example, the most effective positioning of the monitors is determined. This requires careful fire planning to take into account the throw characteristics of the monitors, the proximity of hydrants, the need for hoses or pumps and possible wind conditions. Planning, therefore, is not an option – it is essential.

Frequently, the best solution is a combination of fixed and portable monitors, with fixed monitors acting as the first line of defence, and portable monitors used to protect bunds, deal with fuel spillages and vapour concentrations, and cool adjacent fire risks.

Manually operated or remotely controlled

Monitors can be operated either manually by the firefighter or be remotely controlled.

Remotely controlled monitors enable the firefighter to operate the equipment at a safe distance from the fire, moving the monitor in both the horizontal and vertical planes and, on the most sophisticated units on the market, adjusting the flow, stream pattern and throw. Power is hydraulic, or on the more recent models, electric. Each system has its particular benefits and the leading equipment manufacturers offer both hydraulic and electric options, as well as both manually operated and remotely controlled monitors.

Electric remote control can be supplied with explosion-proof EEx (e) and flameproof EEx (de) electrical equipment in accordance with ATEX (ATmosphères EXplosibles) guidelines for when the monitor is likely to be used in areas that may be exposed to explosive gases. These ATEX guidelines apply in Europe and are similar to the USA's NEC (National Electrical Code) guidelines. The ATEX system is widely regarded as the more comprehensive of the two. It takes a wider range of parameters into account than the US system and

has been mandatory in Europe since 2003. As a result, ATEX is often the preferred system and more recently, the IEC (International Electro-technical Commission) standard has become mandatory for electrical equipment in Europe and Asia Pacific.

Choosing the right monitor

With monitors now in widespread use protecting harsh environments such as refineries, tank farms, fuel distribution depots and loading jetties, chemical processing plants, offshore rigs, aircraft hangars and shipping, they need to be robust and unerringly reliable even in the most arduous working conditions. It is essential that the site operator can depend on the monitor to deliver its promised performance at a moment's notice.

Undoubtedly, the best monitors in terms of build quality, low maintenance and an extended working life are those manufactured using such corrosion resistant materials as stainless steel for the monitor body and bronze for the nozzle and bearings.

The jet reaction force of a monitor can be considerable. Portable monitors need to be securely restrained so they remain "on target" when in operation. Larger portable monitors are usually mounted on trailers that, depending on the stability of the trailer unit may incorporate stabilising outriggers. Some trailers incorporate water tanks that increase the trailer's weight and provide additional stability.

Other considerations when selecting a monitor include compactness of the monitor, a balanced



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design for improved performance and – particularly for portable and manually operated monitors – light weight and the incorporation of low friction bearings for easy manoeuvrability.

Monitor options

The current SKUM™ line-up epitomises the extensive choice of monitors that is now available from the major manufacturers. The FJM range, for example, embraces portable, oscillating, manually operated, and remote hydraulically operated and electrically operated remote fog/jet, water/foam monitors. Most models are FM (Factory Mutual) approved and certified by DNV (Det Norske Veritas), Rina (Registro Italiano Navale), and BV (Bureau Veritas).

The portable monitors deliver up to 3,000 l/min (litres a minute) and are available with the option of dual connection, automatic oscillation and a built-in foam inducing nozzle. The manually-operated, self-oscillating monitors are available with capacities of 3,700 l/min, 6,000 l/min and 11,700 l/min. The WTO S models incorporate built-in foam induction, and depending on the model and capacity, the range of the WTO monitors is between 75 metres and 90 metres plus. These capacities and throw lengths are extended in the manually operated FJM-MAN monitors, where the maximum capacity is 20,000 l/min and the maximum throw is over 120 metres.

The FJM-FJF monitor has a manually adjustable nozzle for flows from 5,000 l/min to 20,000 l/min; a performance that is mirrored by the FJM-SLN that has an automatic nozzle.

The two remotely controlled monitors are the hydraulic FJM-H and the electric FJM-EL. Both include a manual override option. The FJM-H has capacities of 6,000 l/min and 11,700 l/min, with a maximum throw in excess of 90 metres. However, it is the remotely controllable FJM-EL fog/jet monitor range that is proving to be the most popular.

There are three models offering exceptional flow performance. The FJM-100 EL has a built-in inductor option and delivers up to 6,000 l/min to a maximum jet throw of 80 metres, while the FJM-150 EL increases this to 11,700 l/min to a distance just over 90 metres. The top performing FJM-200 EL increases the reach to 120 metres and the flow to 20,000 l/min. Optional components include a control and operating panel, which can be either the standard FJM model or be custom-built, suction hose and valve, and explosion protected EEx (e) and flameproof EEx (de) electrical equipment.

New trailer-mounted monitor

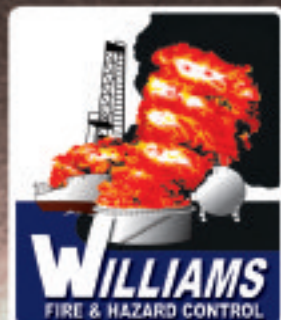
One of the latest monitor offerings on the market is the new RAFT Rapid Response Foam Trailer that is designed to be highly mobile, versatile and cost-effective. It can be fitted with either the FJM-80S or the FJM-100S manual fire monitors and is available as a single-axle 1,000-litre tank capacity unit, and as twin-axle 1,800-litre and 2,300-litre capacity trailers.

Both of these monitors are constructed with built-in foam concentrate inductors that ensure reliable, accurate and adjustable proportioning between one percent and six percent for all types of foam concentrate, eliminating the need for a separate proportioning system. Both the 1,800-litre and the 2,300-litre twin-axle trailers have the option to incorporate either one or two high-capacity hose baskets designed to carry up to six 30-metre long hoses, each with a maximum diameter of 75mm. The trailer's fully-welded tank is fabricated from 2.5mm thick stainless steel and incorporates a 250mm diameter auto-venting, quick-release filling lid, and 2.5mm thick internal baffle plates to minimise any surge. The trailer's stability is boosted by the incorporation of industrial heavy-duty, fully retractable prop stands with jacking pads on each corner.

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Peter Kristenson is Senior Manager, Product Management Team for SKUM foam hardware at Tyco Fire Suppression & Building Products. More information is available by telephone on +44 (0) 161 875 0402, by fax on +44 (0) 161 875 0493, or via email at marketing@tyco-bspd.com or at www.tyco-fsdp.com

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An overview of the challenges – Views on the A380



By Kelvin Burnell

New Chief Fire Officer
at Dubai Airports

On the 1st March 2009, I was recruited by Dubai Airports as the Chief Fire Officer for Dubai International Airport (DIA) and Dubai World Centre Airport (DWC).

I would like to take this opportunity to introduce myself. My career in aviation spans over 30 years, gaining a variety of broad experiences in airport fire service management, airport operations, safety management systems and emergency planning, to mention a few. These experiences were gained in the UK and 5 years overseas (Caribbean) regulatory oversight of the British Overseas Territories. I spent some valuable time at the International Fire Training Centre at Teesside as an aviation instructor and was a former Head of Aviation at the Fire Service College, Moreton in Marsh. Both training establishments are internationally recognised for their training excellence. For the last nine years I have been employed by the UK Civil Aviation Authority as an Aerodrome Standards Inspector.

Dubai Airports

My vision for the travelling community at Dubai Airports will be achieved by providing a service of the highest possible standard. The mission will be to save life, reduce risk, and protect the environment through effective management, training and

the procurement of appropriate rescue and fire fighting provisions.

DIA is well established and more than capable of managing any type of emergency, although there are always continued improvements to be made, which is no different than any other Fire Service. Along side the challenges at DIA comes the comprehensive resourcing and organisation of DWC, which will be Dubai's second civil airport and is being marketed as becoming the largest airport in the world. DWC will require a significant recruitment drive at all fire operational functional levels, vehicle and equipment resourcing and organizing at rescue and fire fighting category 10. This process will need to take place in the very near future in preparation for a proposed airport opening mid to late 2010.

An A380 training simulator is currently under construction at DWC and is due for completion before the end of 2009. This simulator is an essential element for our competency base training regime. This simulator will enable all Dubai airport fire personnel to practice their knowledge, skills and understanding according to a comprehensive role/task and training needs analysis.

Pic courtesy of Dubai Airports



The Fire Service at DIA is well equipped to manage an incident/accident of the largest civil aircraft flying to date. At DIA the largest aircraft is the A380, which operates daily. Although well equipped and organised, we will continually look at ways which will enable the Fire Service to save life effectively and efficiently.

Comments on the introduction of the A380

To ensure we continually provide the correct level of training and operational resources, we conducted a comparison of the A380 against the B747-400, which was our largest aircraft. We found in general terms 3 key areas which have an affect on the achievement of saving life. These key areas have been considered and appropriate measures have been put in place. As part of the airport's safety management systems I shall continue to assess our risks to ensure my CFO responsibilities are satisfactorily addressed and managed.

The 3 key areas identified are as follows, to which I have given a brief explanation of each key area.

- **Emergency Planning.**
- **Upper Deck Access and Increased Passenger Capacity.**
- **Aircraft Mass and Fuel Capacity.**

Emergency planning

Dubai airport's recognises the importance of airport emergency planning as an essential process that prepares the airport to cope with an emergency occurring at the airport or in its vicinity. The objective of Dubai airport's emergency plan is to minimise the effects of an emergency, particularly in respect of saving lives and maintaining aircraft operations.

The introduction of the A380 had a minimal affect on the functional structure and principals of Dubai airport's emergency plan. The plan considered and addressed the increased numbers of passengers from 416 to 555 (approximately 39% increase) in terms of passenger evacuation and control at the accident site, the impact on medical assistance and supplies. Additionally, the impact of increased passenger numbers at the Survival Reception Centre (SRC), Friends and Relative Reception Areas (FRRA) all needed serious consideration in terms of size to accommodate the increased number and control of passengers.

The emergency plan relies on external emergency services support. The airport and these emergency services work extremely hard together in terms of incident command, communications and coordination, which is practiced in accordance with I.C.A.O. recommended Standards. In terms of emergency planning Dubai airport is well prepared to manage an emergency involving an A380.

Upper deck and increased passenger capacity

In general terms the upper deck of a B747 accommodates up to 30 passengers. The A380 accommodates at present around 200. This is an increase of over 600%. The upper deck of the B747 is only a proportion

of the overall length of the aircraft, where as the upper deck of an A380 spans the whole length. This presents a significant impact on all airport Fire Services resources in terms of effective and efficient rescue and fire fighting of the upper deck of the A380 and certainly within the first response phase of an incident. It's this area, which in my view, presents all Fire Services their biggest challenge and likely to affect the minimum staffing levels at airports. This of course is dependant on the quickness and level of support afforded from our external supporting emergency services, but with the best will in the world, an external emergency response to an aircraft accident at an airport and be effective will be no less than 10 minutes and some responses may take up to 45 minutes or more. If a survivable atmosphere within the fuselage is not achieved with extreme urgency, the saving of life will no doubt be affected, therefore, it is imperative airport Fire Services are trained and resourced in this critical risk area.

Therefore, one of the major concerns for both the B747 and A380 is making entry to the upper deck as quickly as possible. The sill height on these aircraft is practically the same at approximately 8 metres. The opening of an aircraft door off a conventional ladder has always proven a difficult task, is time consuming and requires a large resource commitment.

For sometime now emergency equipment manufacturers have strived to come up with an innovated, safe and cost efficient solution to the problem of door opening and entry into an aircraft. Some manufacturers have come up with mobile emergency airstairs, which are designed to



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reduce the time taken in making access to the entry/exit door. These stairs can be deployed with the first responding fire vehicles. The stairs can be deployed as directed by the incident commander at an aircraft entry point instantly, if required, which will allow rescuers quick access, allow evacuating passengers a safe and easy route or be a good platform for the use of positive ventilation of the fuselage. The stairs allow fire personnel safe and effective routing from ground level to aircraft. The stair platform provides a safe functional area for deployment of rescue and fire fighting equipment and crews.

Dubai airport's recognises the value of equipment like mobile emergency airstairs and we are currently conducting an evaluation of the best options. On this issue, we value comments from the airport fire community on best practice options regarding aircraft entry and in particular the mobile emergency airstairs concept.

Aircraft mass and increased fuel capacity

There is a significant increase in mass difference of the A380 compared to the B747-400. However, this is not considered in real terms a major concern to the Fire Service at Dubai airport.

That said, the construction of the A380 has led to the evolution of materials such as the GLARE application. GLARE is a hybrid material built-up from alternate layers of aluminum foils and unidirectional glass fibers, impregnated with an adhesive. GLARE provides additional burn through fuselage protection from an external fire impingement, providing extra time before fire breaks through, causing a possible internal fire situation. This is good as this will give our first response fire crews a little extra time to bring the external fire under control before fire enters the fuselage. Bearing this in mind, the Fire Service at Dubai airport deploys additional major foam appliances, which exceeds I.C.A.O. recommended Standards in an effort to control the external fire spreading

internally and therefore making the best possible utilisation of the extra time afforded by the introduction of material such as GLARE.

That said, GLARE in its construction form is extremely difficult to cut and current tools have proven ineffective. We are satisfied that the cutting tools we currently deploy will achieve effective cutting when required. As part of our continued hazard risk assessments we will resource the Fire Service appropriate to the risks so as to ensure our objective of saving life is achieved.

The additional fuel loading and increased technical and practical critical area of the A380 is accommodated by providing over 100% of extinguishing fire fighting media as required by I.C.A.O. recommended Standards.

In summary, Dubai Airport Fire Service has long recognised the tactical and operational hazards/risks associated with the introduction of the B747. By conducting a comparison with the B747, which was the largest civil aircraft, with the latest largest civil aircraft A380, it is clear that with adjustment to existing emergency planning, additional operational resources, command and coordination with external emergency services the A380 becomes a controllable emergency. The additional hazards associated with the introduction of the A380 are not insurmountable.

It is my mission to ensure our fire personnel are trained and equipped to handle any type of emergency at Dubai airport and together with my officers will continue to strive forward in our quest for excellence.

Therefore, as the new CFO I intend to build on the efforts of all past CFO's. I shall ensure our current competence training regime is enhanced. The fire vehicles and equipment are maintained and commensurate with our current and future risk. Ensure our incident command structure is compatible with our stakeholder. Review all aspects of the Fire Service to ensure we meet the ever advancing changes in design and advancements of aircraft and airport facilities present and future.

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Covered in Foam – an overview of foam systems

By David Owen

Business Development Manager with foam specialist Firemain Engineering Ltd., discusses the various foam systems available

From foam enhanced sprinklers to high expansion generators, foam is used in fixed systems to deal with a bewildering variety of fire scenarios. However, one thing that they all have in common – with very few exceptions – is that flammable liquids are the fuel source. This article will provide an overview of the range from the foam frontline.

The science simplified: foam provides a barrier against flammable liquid vapours without aggressively mixing with the product and enhancing the volatility of fire from the fuel – water alone doesn't float on hydrocarbons and only serves to make matters worse. On the other hand, foam, whether aspirated or unaspirated film forming foam, suppresses the burning vapour either with its suppressant polymer or degree of expansion or both.

How we proportion the foam concentrate with water, and to what extent we expand it, is determined by the application. It's perhaps more informative to look at the system types first to help understand what choices there are to be made.

Foam enhanced sprinklers

Water is a fantastic firefighting medium, no question. However, sometimes it needs a little help

when being delivered through sprinkler systems. Where a site has a large inventory of plastic material or where the storage medium itself is plastic, as in the case of tote bins, adding foam into the sprinkler nozzles via a bladder tank gives enhanced fire control. This is classed as unaspirated foam. In other words, there is no mechanism built into the system for entraining air into the foam to give any expansion. Because the foam is only expanded to what might crudely be called a "milky effect," the foam concentrate itself needs to be aqueous film forming – AFFF. AFFF's have been around so long now that this isn't news and any LPC approved sprinkler contractor will be familiar with its use. Insurers often require an existing sprinkler system to be upgraded in areas where storage has changed over time, this could also apply to high flash flammables where the water will need some assistance if effective fire control is to be achieved.

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This isn't a problem with the inclusion of a locally sited bladder tank and wide range proportioner. The bladder contains the foam concentrate and the bladder is retained inside a pressure vessel, the incoming pressurized water squeezes the bladder which drives the foam into a proportioner and the resulting foam solution flows to the discharge heads. It's essential to deliver the correct mixture of foam to water if one head operates or 20 so wide range proportioners are readily available. Actuation will still be via the frangible glass bulb of the sprinkler head at the set temperature.

Foam deluge systems

The difference between deluge and sprinklers, whether we use foam or not, is simply that in a deluge system a whole zone will actuate and apply water or foam to the hazard. The detection line is separate and controls the opening of a deluge valve to supply foam/water to the hazard. A range of detection options are available from simple air charged lines with detector bulbs through to triple spectrum UV/IR flame detection. On the other hand, sprinklers are self zoning in the sense that each head is both detector and fire control device: if the fire is not controlled by one head operating, more heads will actuate until the assumed maximum area of operation is reached. Because deluge systems use open nozzles we have the option to aspirate the foam so that it becomes low expansion rather than unsuppressed. This is achieved with the use of nozzles that entrain air and give an

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expansion ratio of up to 20:1 but more typically lower. A relatively gentle application of aspirated foam is to be preferred where solvents in particular are stored. Process hazards are typically where deluge systems are to be found.

Again, bladder tanks can be used to proportion the foam into the lines. It needs to be remembered that these are finite foam resources – the tank is designed to supply foam for a set period and the difficulty of refilling bladder tanks means that additional running time is not possible during the incident. Alternatives include balanced pressure proportioners fed by a dedicated foam concentrate pump but these have the drawback of another power source other than the pressurized water supply. Increasingly, a water driven proportioner such as FireDos is being used by installers who want to eliminate this potential source of failure

and to eliminate the need for costly maintenance. Only pressurized water is required to drive the FireDos proportioner. FireDos uses an atmospheric storage tank for concentrate which means that running times are only limited by the foam stocks available as the tank can be refilled during use. It also allows the use of the most viscous foam concentrates with great accuracy in proportioning.

Medium expansion pourers

Using the same methods of proportioning and foam storage, we can expand most of the commonly available foams up to 200:1. This provides a substantial foam blanket but with very limited throw from discharge devices. It's ideal where a gentle application is preferred and where spillage of flammables is contained. This is typically into bunds around tank farms and process areas where bunding is easily achieved whilst not hindering the means of escape. Medium expansion foam was

The vapour suppressing qualities of foams are enhanced by the greater expansion achieved by MEX and by its density, although it should be born in mind that discharge devices need to be regularly placed around areas such as bunds to overcome the limiting effects on the travel of foam from obstructions.

particularly successful at the Buncefield incident for securing the bunds once the more volatile bund fires had been dealt with by monitors.

The vapour suppressing qualities of foams are enhanced by the greater expansion achieved by MEX and by its density, although it should be born in mind that discharge devices need to be regularly placed around areas such as bunds to overcome the limiting effects on the travel of foam from obstructions.

High expansion foam

Along with foam enhanced sprinklers, this is another application where class B fires are not the only limitation to its use. Expanding foam to anything up to 1000:1 means that we have a very light and relatively dry finished foam. Useless in anything but still air, it comes into its own within closed areas. As far back as the mid 90's a Hi Ex Hotfoam system (see below) was installed into a well known building society's deed store because tests showed that the documents were only marginally wetted by the finished foam. The incipient nature of fires in tightly stored paper products means that gas may not always be the medium of choice due to the need to maintain long hold times to prevent further combustion. Hi Ex can provide a good alternative.

However, the main applications for Hi Ex systems at present are for the protection of aircraft hangars and warehouses. For aircraft hangars, NFPA allows a choice of options including Hi Ex, roof level low expansion deluge and underwing monitor protection. Hi Ex is often chosen in preference because it produces far less firewater run-off, a significant issue when considering containment. The two main approaches with Hi Ex are (i) using air from external sources, i.e. opening vents to allow an air supply to the generator and (ii) using an internal air supply that could include the products of combustion from the fire itself, i.e. Hotfoam and its unique ability to generate foam from the exhaust gases and internal air supply.

(i) **Conventional generators** use a water driven fan, combined with a high expansion foam concentrate, to expand the finished foam to anything up to 1000:1. The generators can be located either along the side walls or roof level

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of the hangar or warehouse. Only aircraft hangars are considered large enough spaces not to need external air supply and over pressure venting when Hi Ex is used.

- (ii) **Hotfoam** was developed by Svenska Skum and enables the use of Hi Ex far more economically in spaces such as warehouses. The generator has no moving parts, the high expansion foam discharging through nozzles that are combined with an external mesh assembly to expand the foam solution when mixed with the rising hot gases. The largest unit only weighs 10kg which

approaches for each – fixed roof tanks require foam pourers to be installed into the side wall of the tank with foam solution discharging onto the full surface of the product. Floating roof tanks are designed with a rim seal to contain vapours and it is this area that is vulnerable to fire. The rimseal pourer is designed to discharge around the circumference of the floating roof tank seal. Like all fixed foam systems, the rimseal pourer will tackle fire at an early stage. The means of proportioning foam is similar to our other applications with the possibility of longer pipe runs to discharge devices.

Fixed roof tanks require foam pourers to be installed into the side wall of the tank with foam solution discharging onto the full surface of the product. Floating roof tanks are designed with a rim seal to contain vapours and it is this area that is vulnerable to fire.

means that it can be mounted as a nozzle off distribution and range pipework without the need for additional support structures.

Again, Hi Ex foam discharge devices can be supplied by either bladder tanks or FireDos type systems. It is the type of foam and the discharge device that creates the expansion ratio, not the means of proportioning.

Tank protection systems

Storage tanks are largely divided into fixed roof and floating roof tanks. There are two different

Using a FireDos proportioning skid will overcome any hydraulic issues associated with this as it uses a positive displacement pump to overcome line pressures.

Foam systems are no different to other fire protection media such as gas or watermist: the most important thing is to choose the medium that is most appropriate for the fire hazard. Foam's mixture of vapour suppressant, cooling medium and oxygen depleter means that it can work on all fronts of the fire triangle and is the medium of choice for most flammable liquid fire scenarios.

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By J.C. Jones

School of Engineering,
University of Aberdeen

Oil spills at sea

Although leakage of a large volume of oil from a tanker at sea is a most serious matter, such leakages account for only a very small proportion of the oil contamination of the sea.

Seeepage from subsea oil reservoirs contributes significantly to the oil content of the sea. That is a 'natural' effect, and its anthropogenic analogue is subsea drilling. Operations on oil-bearing ships including tank cleaning, when aggregated internationally, cause considerably more contamination than tanker accidents in which there is loss of containment. As will be more fully explained later in the article with reference to a particular case study, even quite a major oil spill from a tanker though it might impact marine life close to the spill will not have effects beyond that if the oil remains at sea.

Levels of oil in the sea

There is wide variation, but a value of 40 parts per million by weight can be seen as representative. The interested reader can easily confirm that this corresponds to a barrel of oil in about 4000 cubic metres of water.

Examples of major oil spills at sea

These are in the Table and are a representative selection. In order to understand why, as asserted in the Table, the Torrey Canyon was the first major spill one has to be aware of the circumstances of oil supply in the years following the Second World War. Japan, which has no crude oil to speak of,

without numerical adjustment from volume basis to weight basis, leakage of a million barrels followed by hypothetical uniform dispersion would therefore raise the level of oil in the sea by 0.1 parts per trillion¹ against an existing background level of the order of parts per million. Such a rise is utterly negligible.

Supertanker operation extended beyond Japanese imports and in a discussion of oil spillages at sea the clock starts with the first incident involving a supertanker and this, to the best of the author's knowledge, was Torrey Canyon. The second such incident (not covered in the table) was in fact three years later off the Swedish coast. Supplementary comments follow the table.

The 1978 Amoco Cadiz accident was caused by stormy weather, and the vessel broke in two discharging all of its contents. Collision of two oil tankers – Atlantic Empress and the Aegean Captain – in the Caribbean caused spillage an order of magnitude higher than that resulting from the Exxon Valdez accident (which has an entry later in the Table), although the latter has a more prominent place in the history of the subject. In an important sense the incident involving the Atlantic Empress and the Aegean Captain is the most serious of those summarised in the Table on the next page, as there was heavy loss of human

In order to reduce the number of shipments, crude oil tankers on a scale much larger than those previously in service, called supertankers, came into being. A reasonable definition of a supertanker is one which can carry a million barrels or more of crude oil.

was poised not merely for resumption but expansion of her industries after the War and her energy requirements consequently increased year by year. The requirements were met by increased imports of crude oil and proliferation of refineries in Japan to process it. In order to reduce the number of shipments, crude oil tankers on a scale much larger than those previously in service, called supertankers, came into being. A reasonable definition of a supertanker is one which can carry a million barrels or more of crude oil.

Returning to the theme of amounts of oil in the sea, the total volume of the oceans of the world expressed, unconventionally, in barrels (1 barrel = 0.159 m³) is of the order of 10¹⁹. Changing

life through the fires which ensued. Environmental effects were however small. The leaked oil from the collision did not reach shore, and the author's judgement is that a surge of parts per millions or tens thereof in the oil contamination of the sea over a considerable distance would have occurred. Dispersants were used when the vessels, by that time leaking oil copiously, were towed away from the crash site and this would have aided confinement of the spilt material to the sea without impacting the coast. The comment in the final sentence of the Introduction is supported by this case study.

¹ 1 trillion = 10¹²

Hazards and their recognition properties

Vessel	Location and year	Details
Torrey Canyon, on charter to BP	Cornwall England 1967	The first such incident (see comments above). The vessel was carrying just under a million barrels of oil.
Amoco Cadiz	Coast of France, 1978	1.6 million barrels of crude oil released into the English Channel.
Atlantic Empress and Aegean Captain	Off Trinidad and Tobago, 1979	Collision of the two crude oil tankers, resulting in spillage of over 2 million barrels. Fires on each vessel and 26 fatalities.
Exxon Valdez	Prince William Sound, Alaska 1989	About a quarter of a million barrels of crude oil released.
Castillo de Belver	Off Cape Town South Africa, 1983	Between a quarter and a half of a million barrels of oil released 20 miles from the coast. Ignition of the leaked oil.
American Trader, payload owned by BP	California coast 1990	Leakage of about 10,000 barrels of crude oil.
Nagasaki Spirit	Malacca Straits, 1992	Collision with a container ship. Leakage of crude oil. Believed to have been piracy.
Sea Empress, owned by Alegrete Shipping Co	Milford Haven, Wales, 1996	Almost half a million of crude oil barrels leaked during entry of the vessel to port.
Jessica, operated by Ecuador Merchant Marine	Galapagos Islands, 2001	Diesel and heavy fuel oil ('bunker fuel') being carried.
Prestige	Off Spain, 2002	Breaking up at sea of the vessel, which was carrying heavy (residual) fuel oil.
Pacific Adventurer	Off Queensland, Australia 2009	Damage to a cargo ship during a cyclone and release of oil from the fuel tanks.

There have been many commentaries on the Exxon Valdez incident. The amount of oil leaked was modest, but the oil found its way directly to vulnerable parts of the environment. Wildlife was severely affected; the avian death toll was at least a quarter of a million, and to that must be added loss of large numbers of animals such as seals and otters. Effects on the Alaskan seafood industry

were major. The Exxon Valdez was towed to San Diego and, following repairs and modification, re-entered service as the Sea River Mediterranean.

In the Castillo de Bellver accident off Cape Town the oil when spilt did not reach the mainland, but did impact upon a small island where there was some loss of bird life. Unburnt oil in the atmosphere precipitated on to the

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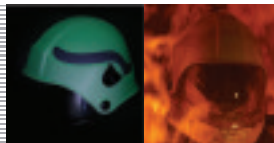
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mainland and there was some concern about effects on crops. The 1990 incident off southern California involved leakage of a relatively small amount, and there was the additional factor of mild weather which, it is believed, led to evaporation of a significant part of the leaked oil and so reduced the harmful effects of the spill which nevertheless led to major loss of bird life and of fish life and also resulted in the closure of beaches. Nagasaki Spirit collided with the container ship Ocean Blessing as a result of an act of piracy. In these early years of the 21st Century piracy is surprisingly prevalent. As recently as August 2008 the Malaysian vessel Bunga Melati Dua fell prey to Somali pirates. It was carrying palm oil from Sumatra to Rotterdam via the Gulf of Aden, the southern edge of which is the coast of Somalia.

In the 1996 incident off the Welsh coast the vessel was being piloted into port, and the Port Authority were prosecuted. The vessel Jessica which leaked its contents close to the Galapagos Islands was carrying not unprocessed crude oil but diesel (a distillate) and bunker fuel (residue from distillation possibly blended with lighter material). The Galapagos Islands are off the South American

The last entry in the Table describes the most recent release of oil at Sea. Pacific Adventurer is not an oil tanker but a cargo ship. During a cyclone cargo containers became dislodged and damaged the structure of the ship with resulting release from the ship's own fuel oil tanks. The amount released was several orders of magnitude smaller than amounts released from tankers in the examples previously discussed, yet damage to the coastline was extensive and a number of beaches had to be closed.

Prevention: double-hulled tankers

If, as was once the norm, tanks for carrying oil by sea are built in such a way that part of the hull of the ship doubles up in function as the outermost wall of the tank, loss of containment on hull rupture in a collision is inevitable. Since Exxon Valdez there has been a proliferation of double-hulled tankers. In such there is an outer hull enclosing the inner one, protecting the latter in the event of collision. These will soon have become standard. The EU will allow only double-hulled tankers in its waters from next year. Similarly, the USA will allow only double-hulled tankers in its waters from 2015.

The world produces 80 million barrels per day of crude oil. A totally authoritative figure for the proportion which transported by sea has eluded the author but it is probably higher than a half. To that must be added very significant movement by sea of refined products. The scale of oil movement by sea is therefore immense. Hazards are fire and explosion and damage to the environment.

coast and straddle the equator. They are maintained largely as a habitat for wildlife and there was therefore much consternation following the incident. The Charles Darwin Research Station, which is concerned with wildlife protection, is itself situated on one of the Galapagos Islands and officers of the Station worked alongside the Ecuadorian army and the island authorities in following up the accident. The Prestige accident off the Spanish coast in 2002 had serious effects, and there is a basis for comparison with Exxon Valdez. An important difference is that whereas (as noted) Exxon Valdez was towed away for repair the Prestige sank and continued to release oil. Oil slicks some distance from the wreck have since occurred and analysis of the oil from such slicks has shown it to correspond to that which the Prestige was carrying. There is some uncertainty about how much oil went down with the wreck.

Concluding remarks

The world produces 80 million barrels per day of crude oil. A totally authoritative figure for the proportion which transported by sea has eluded the author but it is probably higher than a half. To that must be added very significant movement by sea of refined products. The scale of oil movement by sea is therefore immense. Hazards are fire and explosion and damage to the environment. These points have been discussed in this article with selected examples of accidents, their causes and consequences.

Liquefied natural gas (LNG) is also transported in large amounts by sea, and the safety record on LNG shipping is remarkably good. The author might suggest to the Editor of IFF that a follow-up article on LNG shipping be published. Such an article would be timely in that new developments in LNG tanker design are currently being implemented. **IFF**

TRAINING



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Practice, Practice, Practice

(Realistically, Safely, and often)

Many firefighters can go years without experiencing an actual aircraft crash, let alone having to rescue someone from an aircraft. The best lessons come in time through experience, but in order to prepare your firefighters for an actual aircraft crash and rescue you must challenge them through realistic exercises. In order to maximize the learning these exercises must, to the extent possible, mimic as many of the conditions that the firefighters will experience such as heat, smoke, time constraints, physical exertion, etc.

By Frank Diaz

Training Manager,
Texas Engineering
Extension Service
(TEEX), Emergency
Service Training
Institute

There are many textbooks and courses that help teach firefighters rescue and firefighting techniques so in this short article I will not cover them. Instead, I will offer some ideas of enhancing firefighter preparedness through realistic exercises.

I have 23 years in the fire service as a firefighter, leader, evaluator and now Training Manager at the Texas Engineering Extension Service (TEEX). During these years I have seen what has worked and not worked while conducting exercises. I have been both a recipient and contributor to exercises that were not always safe and optimally beneficial. This was mainly through ignorance and poor planning. But I have also been both the recipient and contributor to exercises that were very worthwhile.

As a trainer and evaluator one of the most

rewarding experiences was seeing firefighters perform confidently and competently during actual aircraft crashes. The firefighters did not perform well by chance or by just practicing a particular skill. They were prepared because they were challenged often with realistic training exercises.

I've had the privilege to evaluate US and some foreign airport fire departments through aircraft crash exercises. Although there are differences in funding sources for rescue training and exercises there are some common issues that may interfere with providing worthwhile exercises. I'd like to share my observations in the hopes your exercises will be successful.

Funding is an important factor of quality training and exercises, but I will not cover the funding sources here since each jurisdiction has different

funding sources. The factors I would like to cover are safety, human factors, realism, critiques and videotaping. In these five factors the common thread is planning.

Safety

As with everything fire related, safety is of upmost importance. Preventing injuries or damage to equipment should be emphasized to all. This may sound like common sense, but there are some members in every department that have to be reminded of safety. Deliberate, unsafe acts in the training arena lead to ARFF trucks being damaged or destroyed and firefighters being injured. Safety should be briefed prior to any training or exercise commencing.

During the planning phase of the exercise weather conditions need to be considered. Since aircraft accidents don't always happen during perfect weather some of the exercises need to be conducted when weather conditions are not at their best. Here, I'm referring to uncomfortable, not dangerous conditions. In order for the training to be realistic, firefighters need to know what it is like to train in hot, cold or rainy conditions.

As a military firefighter I served in extreme weather locations such as Alaska, Arizona, Panama, and Kuwait. We at times were evaluated with exercises in very dangerous weather conditions. In these conditions very little learning is occurring while exposing the firefighters to cold and heat injuries. If your policies require you to train in these conditions ensure rehab units and medical

support units are readily employed.

Remember, some firefighters feel embarrassed to admit to their peers that they are becoming exhausted or "can't hack it" so ensure your Safety Officer and other leaders are watching out for their personnel.

Safety guidelines and practices are provided by organizations such as the National Fire Protection Association (NFPA), International Civil Aviation Organization (ICAO), Federal Aviation Administration (FAA), Civil Aviation Authority (CAA) and your local jurisdiction. My experience has been that when someone does not adhere to established safety policies or practices it is usually due to ignorance of the policies and practices, not deliberate disregard for them so ensure you and all participants are aware of them.

Human factors

Rescue training and exercises, just like any other issue in a fire department can be affected by apathy. Apathy in exercises can be caused by many reasons. I've seen some firefighters not want to train due to fear of getting injured. Because of the age and responsibilities of these firefighters they were concerned with getting hurt during an exercise and then not be able to fully support their families. Or they simply felt very confident after many years of experience. Even seasoned veterans still need to participate since, although they may be experienced in rescue operations they still need to see whether their bodies are still up to the task. The time to find out is during an exercise, not a real emergency.



More than

Apathy can also be caused by firefighters becoming frustrated due to poor instruction or planning of the exercises. If the firefighters think the training is unrealistic or poorly organized they will not be enthusiastic about participating.

Properly planned and organized scenarios can go a long way in reducing apathy. Coordinate with the appropriate agencies in organizing the exercises and get input from the firefighters of what they would like to see in an exercise; this will help in the buy in.

Also, ensure you are not always using the same scenarios. This will keep the exercises from becoming routine to the firefighters. Changing the scenarios requires the firefighters to experience more decision making points which leads to growth.

In my opinion, the worst type of apathy is due to plain laziness of some firefighters. By no means should an exercise ever be used as punishment, but conducting well planned and challenging exercises have taught some that there is an important purpose in training and exercising.

Realism

Challenging the firefighters through realistic scenarios is another critical factor to consider. I recall two humorous, but true exercise scenarios I witnessed years ago. One of the scenarios was an attempt by training officers to provide too realistic of an exercise and the other not realistic enough.

While serving in a foreign country, a neighboring airport fire department asked a few of us to

evaluate their aircraft rescue exercise. The scenario was for the firefighters to rescue passengers from a medium sized airliner. The aircraft used was an actual airliner from a South American carrier and the victims to be rescued inside the aircraft were actual volunteers. A 55 gallon drum that was cut in half was filled with rags and a small amount of oil was to be ignited inside the aircraft to create realistic black smoke. Unfortunately, the smoke created inside the aircraft was worse than expected. The conditions became so bad in the aircraft that the volunteer victims could not wait to be rescued by the firefighters so they opened the escapes and jumped out of the aircraft. The small fire was extinguished and disaster averted, but as you can imagine, it could have gotten out of hand.

The second event I recall occurred when we were tasked with training firefighters from a foreign military service in preparation for a United Nations peace keeping mission. We trained them at our home base using our training facilities. They were appreciative they were able to train and exercise using an actual live fire training mock up. This was the first time they had ever been exposed to an aircraft mockup that could be used for live fires and yet, be safe and realistic.

They explained to us that at their home airport firefighter academy the final aircraft rescue exercise scenario was a bit more rudimentary. The scenario was to save a live chicken that was tied inside an open 55 gallon drum. The drum was covered in brush and pallets and set on fire resembling a bonfire. If the firefighters were able



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Pic courtesy of TEEX



to extinguish the fire and save the chicken they were considered successful in their task.

Sure I mention these stories in part for their humor, but obviously someone must have thought they were conducting safe or realistic training exercises. These types of misconceptions are not limited to certain countries.

Aside from having proper training props you must also ensure you are conducting these exercises at night, not just during the day. We all know there is a big difference operating on a flight line at night than during the day. The same holds true for gaining access to an aircraft at night.

Sometimes it isn't poor training props that make an exercise unrealistic. Sometimes management decides to only use their best firefighters during high visibility exercises. I too am guilty of this. Sometimes when we know airport managers, mayors or other leaders will be observing the exercise we deliberately set up the response crews with our best firefighters in order to guarantee a good performance. This has to be avoided to the extent possible since this is not only unrealistic, but can cause morale issues to those crewmembers that were replaced for the exercise. At the very least, when the show is over, you must go back and exercise the rest of the members.

Something similar to this is exercising your crews with above normal staffing on the vehicles. In order not to build unrealistic confidence in your firefighters, you need to task them with the crew they normally would respond with. If staffing is normally two on a vehicle, do not exercise them with four on a vehicle just to try to get as many people trained during one exercise.

If additional help is needed then include your mutual aid partners or other agencies such as medical and police support. This not only gives you the additional assistance you may need, but also helps build relationships and identify strengths and weaknesses before a major emergency occurs.

During my days as an evaluator, I reviewed many well written emergency response plans, but unfortunately, some were never actually practiced

until we showed up to evaluate the emergency responders. If we knew certain plans had never been practiced then our team of evaluators would create exercise scenarios that required the responders to implement these portions of the plan, not to try to prove the plans wrong, but to see if they actually worked. Many times the responders would learn there were holes in their written plans so helping responders improve and tweak their plans was always satisfying.

Critiquing and videotaping

Lastly, photographing and videotaping these exercises is a critical tool to use during the evaluation/critique of the exercise. Videotaping may add to the stress to those involved, but firefighters who know they are being videotaped have been known to step up their game during exercises.

More importantly, video and photos are critical to a successful critique of an exercise. Proper and improper procedures can be highlighted during the exercise debrief. The videos of good rescue techniques can also be used later for training purposes.

The critique should not be used to criticize or embarrass firefighters. The critique is part of the evaluation and learning process. The first time someone is criticized or embarrassed during the exercise, all learning stops and a negative attitude towards exercises and training develops. Again, the training and exercises are used for firefighters to learn and to give them experiences of what may occur in a real world situation.

Summary

Nothing can completely prepare you for a major aircraft crash, but exercises can help your firefighters be prepared to the extent possible.

The training should be conducted within accepted standards of safety, should be well planned and realistic. Keeping these factors in mind can help reduce the human factors that often derail or reduce the effectiveness of exercises.

IFF

Frank Diaz is a Training Manager at the Texas Engineering Extension Service (TEEX), Emergency Service Training Institute. He rose through the ranks in the US Air Force fire service and spent the majority of his 20 years serving in 12 foreign countries during peacetime and wartime conditions. He holds a Master's degree in Public Administration, Bachelor's degree in Occupational Education and an Associate's degree in Fire Science.



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Simulated vehicle contamination during FRS detection training using ultrasound



DIM Instrument Training

– the Achilles' heel in fire service CBRN response?

By John Saunders

Argon Electronics

In October 2008 the UK National Audit Office (NAO) published a document titled "New Dimension – Enhancing the Fire and Rescue Services' capacity to respond to terrorist and other large scale incidents".

The report describes how the ongoing New Dimension programme, set up in the wake of the 9/11 US terror attacks, includes a remit to extend the capacity of Fire and Rescue Services (FRS) in England to deal with the consequences of terrorist use of weaponised chemical or radiological materials by provision of such as Incident Response Unit vehicles for transporting new mass decontamination modules. The considerable achievements made in progressing towards this end have included the delivery of 17 dedicated Detection, Identification and Monitoring (DIM)

vehicles, but the spectrum of specialist DIM devices carried aboard present a difficulty in their own right, which is replicated down through the wider provision of the more basic detectors across the FRS., and is alluded to in the NAO report where it notes that "sufficient firefighters have been trained for all equipment types except the Detection, Identification and Monitoring capability." The FRS in England are not alone in facing this issue.

At the heart of the training dilemma is the fact that the increasing numbers of DIM instrument

Simulated CBRN casualty contamination using electromagnetic sources



types being deployed around the world all share a common feature: they are designed to respond to specific and highly dangerous substances and materials that are unacceptable for use in many training environments, and they are designed to exclude, as far as is possible, any alternative

stimuli. A simple chemical detector may be able to determine the presence of a nerve agent, and more advanced technologies may be able to identify that substance as, for example, Sarin. Similarly a radiation dosimeter or survey meter may detect the presence of harmful radiation at the scene of an incident, and a more advanced spectrometer may be able to provide the name of the radionuclide responsible for the emission, but in either instance you would not necessarily wish to expose trainees and the environment to such hazards. So how then to learn the correct use of DIM equipment in both a realistic and safe manner?

The first issue to resolve is how to remove the hazardous substances defined by the threat scenario from the setting for the training, and replace them with something that will closely imitate the dynamic characteristics and material properties of the agents of concern, whilst at the same time eliminating all risk of harm or damage to trainees, their equipment, and the wider population and environment.

For FRS instructors the use of an encoded ultra-sound transmitter could provide the first part of the solution. Compact and power-efficient transponders can be pre-programmed by an instructor to represent, for example, a specific chemical weapon agent (CWA) such as Sarin, a generic class of CWA such as a 'nerve' agent, a toxic industrial chemical or even a chemical that might, as an 'interferent', cause a real chemical detector to display a 'false positive' response. With

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a range of digitally controlled variable emissions the 'concentration' of the simulated chemical source may be adjusted to vary the strength of the detectable signal from around 1 to 30 meters, and just as with a real chemical vapour, the surrounding environment may be brought into play in replicating the desired characteristics of a gas in response to, for example, a closed door or a strong wind.

Similarly, these ultrasound devices can also be used to represent gamma radiation emitters, either as a directed energy source or, by use of a 'spreader' on the transponder, as a 360° hotspot release. The consistent signal emission enables teaching of such as inverse square law, whilst the programmable design of the units also permits simulation of specific isotopes.


Whether used to simulate either a chemical or radioactive hazard, overlapping deployment of multiple 'sources' programmed with the same code enables representation of weapons effect over larger areas, and could also be used, for example, to 'mask' a secondary and alternatively programmed simulation source. The sources can be used to represent a multitude of different CBRN scenarios, from contamination of vehicles that have driven through 'hot' zones by concealment of the ultrasound unit in a wheel arch, to their concealment in debris in creation of the aftermath of a radioactive dispersal device (RDD; a 'dirty bomb') detonation, and furthermore, they can be used inside buildings or outside in any weather or climatic conditions without variation in their performance over repeated exercises.


For training in the detection of either weaker chemical point sources or short range radioactive alpha and beta emitters permanent electromagnetic pouch sources provide a second means of replacing the real threat materials with a safe simulation alternative. Supplied in a range of strengths to suit the particular parameters of the required scenario, they can be discretely concealed on personnel for decontamination training or used to familiarise students with close proximity search techniques.

Finally, a third technology is used for specialist radiological contamination, cross-contamination and decontamination training where solid and liquid radioactive materials are imitated using a safe fluorescent simulant.

The selection of the most appropriate type of simulation technology from those described above will of course depend on the type of DIM task that is to be taught, and the form of the simulation detector will correspondingly be determined by the type of DIM instrument that is employed in response to specific tasks and individual circumstances. Simulation instruments fall into two basic design categories (the first being where a detector is wholly substituted by a simulator, and the second where a component probe is simulated which can be used with the real primary detection instrument), but for the fire fighter responsible for the instruction of CBRN responders, the advantages of using such systems will not so much be appreciated for the differentiation between systems and sources, but for their commonality, as will be seen below.

Argon simulation instruments are well known for the degree of fidelity they provide in terms of replicating the functions and features of specific





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DIM instruments, and for the level of equipment specific competency engendered by their use. Instructors have also come to understand the value of being able to teach remedial action in response to the simulated instrument faults and failures they are able to remotely create during a training session, and the ability to provide comprehensive analysis of a user's operation of an instrument during after action review of student errors has enabled the assurance of auditable consistency to standards of instruction. However, one of the increasingly appreciated features of these systems is their inter-operability.

As already noted, there is an increasing reliance on technology in the response to CBRN attack, and the range and complexity of DIM equipment presents a growing burden on the training resources of fire service organisations, not least when multiple individual DIM instruments are used in conjunction with each other to provide a comprehensive series of procedural initiators.

A clear example of this can be seen in the use of a range of DIM instruments for the detection and identification of potential CWA's. Whereas, in days gone by, a front line fire service responder might be grateful to possess even a single type of instrument, it is increasingly the case that he or she will have a number of technologies at their disposal at the site of a terrorist inspired chemical release. An ion mobility spectrometry (IMS) based device, such as the Smiths Detection LCD3.2e lightweight chemical detector, might provide initial warning of the presence of a generic class of potentially lethal gas. Another IMS-based device, such as a Bruker RAID-M100, might then be used to provide agent identification of the threat at

hand, and, in order to provide the confirmatory assurance of a secondary technology, a Proengin AP4C detector might be simultaneously deployed in reflection of its employment of flame photometry (FP) as its analytical mechanism. Once the hazard has been assessed to be of sufficiently convincing concern, detailed analysis of the agent of concern would typically be sought, and in this the Inficon HAPSITE® family of gas chromatograph/mass spectrometer systems is a typical example of equipment employed by a number of fire services around the world. So far, so good, and all good practice. However, the difficulties that might potentially reduce or even nullify the combined benefits of such a complete DIM equipment suite begin with the operator who has not been sufficiently trained in the complementary use of his tools.

Having determined that, for reasons of safety and cost alone, 'live agent' training is not a viable means of providing DIM instrument training for the increasing numbers of FRS personnel now required to be proficient in CBRN response, a common reaction is to turn to use of a chemical stimulant in conjunction with use of real chemical

detectors and identifiers. Such chemicals carry intrinsic risks in their own right, but, in terms of multi-instrument DIM training, the most serious drawback is that there is no guarantee that they will create a realistically consistent response across the range of the deployed devices. For users of Argon simulation systems these concerns have been removed.

By appropriate programming of the ultrasound simulation sources described above, and, using the same example for the DIM equipment, by substitution of a LCD-SIM, RAID-M100-SIM, AP4C-SIM and HAPSIM-P (a simulation probe that works with the real HAPSITE® instrument) that all respond to the same common technology platform, instructors are able to recreate the exact responses of each of the individual real instruments as would be experienced in the context of their co-ordinated use.

In addition to enjoying the benefits of enhanced control over individual instruments during a training session, and being able to objectively record and report on the operational skills of individual operators, approved training scenarios can be repeated with unwavering accuracy, or rapidly adjusted to meet changing priorities. For those holding the purse strings benefits will include a removal of the expense of consumables, recalibration, and the eventual early replacement associated with running real instruments, and, most importantly, for those FRS responders whose task it will be to risk their lives in the protection of the public following a CBRN attack, they will be able to concentrate on the task at hand with a confidence in their equipment that is born of experience.

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GSF Group Launches Revolutionary Power Pack Unit For Emergency Services

GSF SLIDES, the UK's leading supplier and manufacture of telescopic slides and tilt systems, announced the launch of the Interfron range of backpack and hydraulic power units for the emergency and blue light industries, earlier this week.

Jon Lye, Managing Director of GSF explains: "GSF is unique in the respect that we're able to respond to operational needs of the emergency, defence and blue light industries quickly and efficiently. The uniqueness of the Interfron range definitely improves emergency operations; it's an innovation in design and one we believe will make a dramatic difference to the industry."



Indeed the range of battery powered backpacks are unique in the respect that it gives emergency crews complete freedom from power suppliers; no hydraulic extensions and no attachments mean no entanglements, which, in low visibility high risk environments, reduce accidents and increase access to enclosed and otherwise inaccessible spaces.

At the heart of the range is the SP700 and the VP700, both of which can be fitted with the appropriate hydraulic connectors, enabling the units to operate rescue tools from all major manufacturers, including: Holmatro, Amkus, Lukas, Zumro, Weber, TNT, Lancier, Nike Centaur, ResOtec and Enerpac. The units can be adjusted to use hydraulic pressure at 5100,



9200 and 10500 psi. Each unit has a total weight (approx) 18kg (40lbs).

"Feedback from the enquiries we've been receiving, confirm our belief that hydraulic hoses powered by fixed fuel generators will be a thing of the past," declared Jon. "Our backpacks have 30 minutes of operational use and it takes seconds to refit a new battery. Early adopters of the Interfron power-packs are already seeing more operational advantages opposed the heavier, less efficient combustion units currently available. Essentially, when all's said and done, the most important considerations are user safety, equipment efficiency and accessibility at the point of operation; the



Interfron range delivers to these objectives unconditionally."

Other key features include (on the VP700) integral control valves, which enable control of equipment extensions, such as hydraulic rams, which often have no inbuilt controls. In addition the VP700 has been designed for varying emergency conditions; the VP700 is water tight to a depth of 2m, meaning it's a quick, free-moving system, making it suitable for sea and water rescues,

The Interfron range also includes three conventional, free-standing petrol driven hydraulic pump units, which are designed with protective roll cages, scope to connect two tools at once and an in-built controls.

For more information on the INTERFRON range please call GSF on +44 (0)1691 770303 or visit www.gsflides.com

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ASEO has introduced a new, innovative protective equipment range to their protective equipment range and slash resistant t-shirt that is other in the market.

These 100% concealable and practical garments are made from Spectra® a material that is four to five times stronger than steel and 40% stronger than Kevlar. It has undergone extensive tests to ensure it is the toughest, most effective garment out there, offering the highest available cut resistance.

The need for this type of product for fire fighters is paramount as violence levels and knife crime increase worldwide. We are all aware that many fire fighters face the risk of violent attacks on a daily basis, and should be fully protected to prevent injury if such an attack occurred.

ASEO, globally renowned experts in knife protective clothing have introduced a range of knife and slash resistant garments to give fire fighters peace of mind and ultimately protection from attacks from any form of edged weapons. Spectra®, the material used in the garment has a very high strength to weight ratio and is practical and comfortable to wear with a high level of breathability, unlike most personal protective equipment.

The t-shirts have been designed with an inner layer of Coolmax® for heat and moisture management and offer the highest level of protection, tested to BS EN ISO 13997:1999. All Spectra® lined garments are washable to 60° to help fight infection and cross contamination and comply with many countries health & safety regulations. After significant time spent on research and the development stages, ASEO has produced an unrivalled product that should ensure the wearer feels secure wearing it, without restriction of movement.

For more information contact Robert Kaiser, CEO & Founder of ASEO on +44 (0) 1765 692550 or email rk@aseo-europe.com



Seagrave Carolina Relocates To Larger Facility



SEAGRAVE FIRE APPARATUS, LLC, announced that its commercial vehicle manufacturing and apparatus service facility in Rock Hill, South Carolina (Seagrave Carolina), moved to a larger facility within the city.

Seagrave Carolina relocated from its former facility on Lesslie Highway to meet its growing needs and to better serve Seagrave customers. The new facility is located at 251 North Wilson Street and has 19,500 square feet under roof. Six offices, a conference room and an employee lunch room occupy 2000 square feet of the facility. The increased office space and manufacturing area will improve operations and create efficiencies in through-put, delivery time and service on apparatus. The facility features fabrication and assembly areas, a paint booth, an inspection bay and service bays. Seagrave Carolina's phone number will remain 803-980-3575.

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For more information, visit seagrave.com

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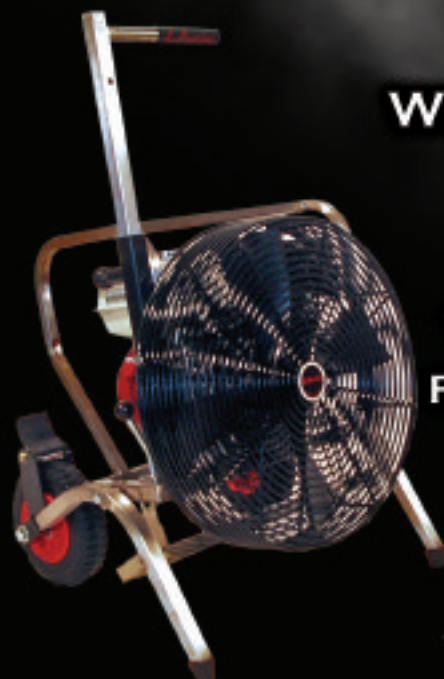
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- UK presence is very strong with over 90,000 employees, 18,000 vehicles and over 550 sites.
- All logistics solutions are underpinned by the latest IT solutions ranging from global bespoke Warehouse Management Systems to standard off-shelf electronic point of delivery confirmation.

DHL Exel Supply Chain are delighted to be the logistics partner for the FirePower™ brand, and will leverage its scale and broad range of services, and financial stability to deliver a world class and currently unrivalled service to the Fire Brigades.

THROUGH-LIFE SERVICE IS PROVIDED BY:

Fenland Laundries Ltd

Fenland Laundries Ltd provide the through-life support of the Firepower™ fire fighter garments via:

- Specialised low temperature laundry processes.
- Ozone and biocide disinfection processes.
- 21 point inspection.

For more information about Firepower™ please contact:
Firepower™
Telephone: +44 (0) 1722 711117
Email: info@fire-power.co.uk
Website: www.fire-power.co.uk

Why there's a choice!

- Full repair or replacement of uniform.
- Detailed track and trace of each item by barcode or RFID technology.
- Asbestos presence/release testing.
- Fenland additionally offer Fire Garment rental programmes to assist with budgetary control.



Founded over a century ago, Fenland is today firmly established as one of the UK's most respected names in the field of Textile Rental. The company operates three factories offering nationwide coverage.

Fenland is committed to maintaining the very highest levels of quality in every facet of its operation; a commitment exemplified by the company's ISO9001 accreditation.

Fenland has a programme of continuous investment in new technology, having its own R & D department, which has developed niche specialised decontamination processes such as the ozone based low temperature system specifically for fire garment use.

Every garment is fitted with a barcode or RFID electronic chip which can be read automatically in our process. Information specific to your garments allows us to customise the laundry process and distribution to your specific requirement.

For example you may wish us to undertake a specific repair or alteration on one or more of your garments. We place an electronic "flag" against the garments involved, and next time you send the garments into us, the flag informs our operator of the actions required.



FIREPOWER™ The Key Points:

- Financial strength and depth, able to cope with supporting the whole of the UK's services.
- Flexible "optional" approach to each application. Firepower™ will provide just one element to a brigade or integrate all of the services, a true "pick and mix" is available to suit all requirements both technical and budgetary.
- Access to leading edge technology in the fields of technical fabrics, construction techniques, qualification, certification, decontamination, logistics, management and information technology. All of Firepower's members have a strong historical link to this field of product and service.
- Scale of operations – controlling costs yet building in resilience and contingency, Firepower™ can provide a secure service.

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Fenland Laundries Limited
Providing Firepower's fire garment cleaning, decontamination, inspection and repair services



Fenland Laundries Ltd
Roman Bank, Skegness, Lincolnshire. PE25 1SQ
Telephone: 01754 767171
E-mail: enquiries@fenlandlaundries.co.uk
Web: www.fire-power.co.uk

New generation WEBER-HYDRAULIK rescue cutters

The new generation of WEBER-HYDRAULIK rescue cutters are the result of continuous development to further improve the renowned reputation of WEBER-HYDRAULIK cutters, which have lead the market for many years.

As manufacturers continue to improve the strength and composite of materials used within automobile construction, the demands of the rescue equipment increases with each new vehicle generation. Offering a maximum cutting force of 1030 Kn our latest cutter, the "New" RS170-105 ensures that the most modern materials in cars and trucks are tackled with ease.

Designed blade geometry pulls the materials to be cut, into the centre of the blade arrangement, thus always guaranteeing optimum cutting performance. Additionally to aid the cutting of round/bar material the base of the blades are equipped with an aggressive bolt cutting serration recess which enables solid material up to 43mm diameter to be cut simply and safely. Complete with a 360° adjustable and removable handle, combined with its comparatively low weight and unique push button control, further ensures that this ultimate rescue tool is operated with ease.

Weber Hydraulik have over 65 years' experience in hydraulic applications and have been supplying the world's fire and rescue departments with quality rescue equipment. Founded in 1939 by Emil Weber the company has remained wholly owned by the Weber family. The company employ 1100 staff and its current turnover is in excess of €210 million.

IFF



Update of RS 170 cutter

- 200mm blade opening
- new blade design for better cutting performance tested on the modern car models and prototypes designed to cut high strength materials and constructions of A-,B and C posts
- 107 tons cutting force
- cuts 43mm round bar
- NFPA cutting class: A8 / B9 / C8 / D9 / E9
- Weight: 19.9 kg
- single coupling

For more information please contact:

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Austria
Tel: +43 72 55 62 37 464
Fax: +43 72 55 62 37 461
Email: reiner.anritter@weber-hydraulik.com
Website: www.weber-hydraulik.com





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Cutter RS 200-107

Power and Cutting Performance like never before!

- Up to 107 tons
- 200 mm blade opening to fully surround modern A, B & C posts
- Weight: 19,9 kg

For more information please go to
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Experience expert knowledge.

Ecoguard First in Series of Fluorine-Free Chemguard Products

Chemguard will introduce fluorine-free *Ecoguard* 3% and 6% synthetic fire-fighting foam concentrate at the 2009 National Fire Protection Association Conference and Expo in Chicago. The first and only UL Listed fluorine-free foam for multiple applications, *Ecoguard* produces a strong and cohesive vapor-suppressing foam blanket for rapid knockdown and extinguishment and re-ignition protection in topside, handline, and sprinkler applications. The current formulation was developed for use on hydrocarbon-type fuels, such as diesel, gasoline, and kerosene.

The first in a series of Chemguard fluorine-free, eco-friendly formulations, *Ecoguard* provides dependable protection for a wide range of hazardous areas, including hydrocarbon fuel storage tanks, aircraft hangars, processing facilities, storage warehouses, truck and rail loading and unloading facilities, docks and marine tankers, and flammable liquid containment areas. *Ecoguard* also is suitable for mobile equipment.

Chemguard *Ecoguard* 3% and 6% foam concentrate was designed for use with in-line balanced pressure and pump-pressure proportioning skids, bladder tank balanced-pressure proportioning systems, around-the-pump proportioners, and handline and air-aspirating nozzles with fixed-eductor pickup tubes. *Ecoguard* is suitable for use with foam chambers, air-aspirating and various non-air-aspirating sprinkler heads and spray nozzles, air-aspirating foam nozzles, and foam makers for use on both floating-roof storage tanks and dike/bund protection systems. When accurately proportioned in accordance with Chemguard's recommendations, *Ecoguard* is effective using fresh, brackish, and salt water.

A substantially biodegradable formulation, *Ecoguard* presents the lowest environmental impact of any UL Listed Class B fire-fighting foam. Besides being free of perfluorooctyl sulfonate (PFOS) and perfluorooctanoic acid (PFOA), *Ecoguard* does not contain alkyl phenol ethoxylates, or organofluorine.

With *Ecoguard*, firefighting professionals have a choice between fluorine-free foam and short-chain fluorosurfactant foam for effective fire suppression. The superior environmental impact properties of *Ecoguard* make it attractive to municipal fire depart-

ments, as well as to industrial, marine, and military firefighters.

Chemguard Solutions

Founded in 1984, Chemguard has become a global leader with a reputation for exacting research and development, high-quality products, comprehensive customer support, and deep industry knowledge. ISO 9001:2000 certified, Chemguard serves the fire suppression and specialty chemical industries. In addition, Chemguard is developing a new line of durable foam-concentrate pumps for fire-protection systems.

Chemguard's Fire Suppression Division manufactures fire suppression chemicals, designs and manufacturers firefighting equipment and systems, and provides engineering support. Chemguard's extensive line of durable and field-proven fire-fighting hardware includes fixed-system proportioning equipment, discharge devices, portable equipment, custom-engineered trailer- and skid-mounted foam systems, self-contained foam units, and large dry-chemical skid units.

To enable Chemguard to offer alternative products for environmentally conscious firefighting professionals, our Specialty Chemicals Division is developing a new line of fluorine-free products for introduction to the firefighting industry, in addition to new, short-chain, C6, fluorosurfactants and fluoropolymers. Chemguard also is developing and manufacturing low-fluorine-content aqueous film-forming foam (AFFF), alcohol-resistant AFFF (AR-AFFF), and other leading-edge, six-carbon-molecule foam products.

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Thermal Imaging Cameras (TICs)

Having worked in the thermal imaging business for over 30 years, e2v's engineers continue to lead the way in supporting the emergency services by providing them with the latest in thermal imaging technology.

e2v thermal imaging cameras were the very first to be supplied to the world's fire fighters back in the 1980s. Argus thermal imaging cameras, as they are now known, have come a long way since then but e2v continue to provide the most advanced TICs to fire and rescue personnel working to save lives and property.

Argus cameras utilise a Microbolometer sensor matched with electronics designed and manufactured by e2v, ensuring that quality and durability are built in. Argus cameras are designed to the highest specifications, giving emergency services personnel the knowledge that they are using the best thermal technology available to them.

The Argus4

The Argus4 HR320 is the latest fire camera to join the Argus range. With its 320 x 240 high-resolution detector, and high definition LCD screen, it provides by far the best image quality of any hand held thermal imaging camera available on the market today.

Weighing less than 3lbs (1.3kg), the Argus4 is extremely light, and comes packed with the most advanced features available on the market today. Argus4 cameras come with up to x4 zoom, 13 colour settings and a picture capture facility that is capable of taking up to 100 pictures. These can be stored on the camera and then downloaded to a PC/Laptop through a USB cable for quicker transfer. The Argus4 HR320 has been designed using advanced digital imaging technology for a sharper picture and superior performance.

Despite its small size, the Argus4 is extremely robust. With its ruggedized casing, the camera is resistant to heat, water and impact, and it is also resistant to short term immersion in water, and has a 2-metre drop test certification.

Features:

Enhanced Dynamic Scene Colourisation (EDSC): Providing the user with the opportunity to colourise the thermal image. With the Argus4 HR320 the dynamic scene colourisation has been enhanced to give the user greater information.

Direct Temperature Measurement (DTM): This feature displays the temperature of objects within a defined area of the thermal scene.

SceneSave™ Digital Image Capture: The Argus4 HR320 can capture and store up to 100 images. These can then be viewed or deleted using the remote control supplied. Using the software provided the captured images can be downloaded to a suitable laptop/PC and then exported in various formats.

Tri-Mode Sensitivity: The Argus4 HR320 now has an expanded third level of sensitivity for very high scene temperatures, enabling clear imagery at extreme levels of heat. This expanded temperature range means that temperatures in excess of 1000°C can be identified.

Customisable Start-up Screen: A feature of the



camera that allows brigade logos or station names to be added to the start-up screen. This can be beneficial for asset tracking and/or personalisation of the camera.

Ambient Temperature Measurement: A sensor fitted to the front of the camera measures the ambient temperature of the local environment, which is then displayed on the viewing screen.

Future Argus developments

Looking to the future, advancements in e2v's thermal imaging camera technology are likely to be influenced by moves towards even smaller and lighter cameras, meaning that the personal camera could become a reality. The personal camera could become small enough and cheap enough for every firefighter to have one as part of their basic kit, removing the need for a separate cameraman. The challenge with this is designing something that can be stored on the firefighters uniform neatly and easily when not in use, so that it doesn't hinder a rescue where the firefighter needs both hands free.

Even further down the line, a 'Heads-up' display on the firefighters BA (breathing apparatus) mask is certainly something that we can aim towards. In this instance the visual would be transmitted from a miniature camera to the mask, projecting a colour image right in front of the firefighters eyes. This would enable the firefighter to have access to both hands and have perpetual access to the camera, even when exiting a fire with a casualty.

Argus thermal imaging cameras have come a long way since they first came on the scene in the 80s, they are smaller, lighter and the picture quality has improved tenfold. The camera of the future is yet to be decided, but one thing is certain, progress cannot be stopped. Although it is impossible to describe the TIC of the future, as long as progress is being made, the camera will continue to improve.

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For more information:
Email:
argus.enquiries@e2v.com
or visit us at
www.argusdirect.com

e2v



Argus4



Argus4 LITE



Argus4 HR320

A test of courage...

...and image quality, durability,
reliability, performance, image capture...

Test the Argus4 Thermal Imaging Camera and find out for yourself why it's proven to be the best TIC in its class. Thousands of fire departments around the world rely on the technologically superior Argus4 to save lives and protect their own.

The Argus4 is designed specifically for firefighters. Its high resolution detector, crystal clear display screen, and up to x4 zoom ensure maximum

visibility in any situation. It's also extremely light at just 3lbs but not at the expense of its strength.

The Argus4 is one of the toughest cameras out there, withstanding extreme temperatures thanks to its rugged and durable casing. And with SceneSave image capture for up to 100 images, plus spot and ambient temperature detection the Argus4 really can give you the courage you need to do your job.

Heat Protection from Head to Toe

Lenzing FR® teams up with partners in the industry, to take flame resistant clothing to the next level!

It's likely that Lenzing FR® is in far more protective garments than most people realise. The high performance heat protection fibre, which started life more than 30 years ago as Lenzing Viscose FR, is used in millions of garments everyday – with military personnel, police forces, fire fighters and industrial workers worldwide receiving its benefit. But it's really since the fibre's relaunch as Lenzing FR® in 2004 and the change into a Modal FR basis, that its profile has risen in the PPE market. Now, fibre and brand look set to gather momentum thanks to a wide range of new fabric types for protection in even the most hazardous workplace conditions.

High performance heat protection

Lenzing FR® is equally recognized as a high performance flame resistant fibre and as a blending fibre that can improve the performance of Aramids. According to European and International standards, fabrics made of Lenzing FR® protect against heat derived from liquid molten metal splash, electric arc, flash fire, flammable liquids, welding sparks and radiant heat. Protective clothing made of Lenzing FR® is inherently flame resistant, which results in permanent protection for the lifetime of the garment. This means that workers or rental laundries don't need to count how often garments have already been washed.

Lenzing AG says: "The secret of this lies in the fibre itself, as it doesn't store the heat but feels immediately cool, even after severe flame and heat exposure." Extensive manikin testing, which simulated flash fire exposure has confirmed that garments including Lenzing FR® fibre show less third degree burns, as well as almost zero percent heat shrinkage, compared to other available materials with the same weight.

Combining comfort

Companies and workers worldwide are now selecting Lenzing FR® protective clothing not only because it offers better protection, but because it provides also comfort and flexibility. Its body climate control properties minimize the risk of heat stress and heat stroke, whilst its inbuilt moisture management effectively suppresses the growth of bacteria responsible for bad odour. Certified to ÖKOTEX Class 1, Lenzing FR® fabrics are also known for feeling exceptionally soft and gentle on the skin.

Lenzing AG says that we should accept nothing less for our skin. "As our skin is the most important 2m² in our life, we need to take good care of it. It's not necessarily the actual fire, metal splash, or electric arc, which is harmful to our skin, but rather, the heat created. To be protected we need



to wear protective clothing – and the protective clothing should be comfortable to wear. This combination of ultimate protection and comfort is a constant research priority for Lenzing®.

A flexible future

Lenzing FR® fibre is also being blended with other high performance fibres to improve existing clothing concepts for the end user in specific risks and situations. For example, fire service fabrics in blends with Aramid fibres have been developed. Although superior for fire fighting applications, this blend can't be used for molten aluminium protection, as the metal would simply stick to the Aramid fibre. So for molten metal, blends with Lenzing FR® and wool have been invented providing excellent molten metal shedding and protection for the workers, along with great comfort and moisture management properties.

Lenzing AG says: "This flexible technology results in a unique head to foot concept, from protective hoods, functional underwear, coveralls, flame resistant fleece cardigans, foul weather clothing, high visibility protection in high visibility yellow and even flame resistant socks – nearly everything is possible!"

To summarise: Lenzing FR® maximizes the performance of the wearer while minimizing the risk of burns, heat stress, heat stroke and ultimately loss of life – properties that weren't invented to keep a low profile.

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More comfort less heat stress

Lenzing FR[®] is a specialty high performance fiber. The abbreviation FR stands for "flame resistant". Lenzing FR[®] is a natural fiber derived from wood. It offers protection from heat and flame in a variety of different applications. Unique thermal insulation properties combined with permanent flame resistance make Lenzing FR[®] a "Heat Protection Fiber". Lenzing FR[®] keeps the body cool and dry and prevents heat stress and heat stroke.

Leading Fiber Innovation

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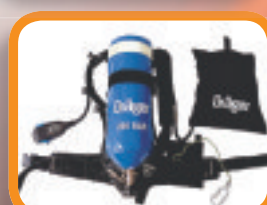
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One size fits all?

Moussol FF, a new universal foam manufactured by Dr. Sthamer of Hamburg has recently been independently accredited to ICAO Performance Level B. The foam is not overly viscous, is suitable for use with CAFS on both class A and B fires, is alcohol resistant, is rapidly biodegradable and is 100% fluorine free – but can one size really fit all?

Dr Sthamer of Hamburg in Germany, has been established since 1886 when the chemist Dr. Richard Sthamer began his own pharmaceutical manufacturing facility. In 1936 Erich Sthamer (son of Richard Sthamer) led the development of protein foam concentrates. At the beginning of the fifties when, Jurgen Sthamer, the third generation entered the company, it succeeded in developing a synthetic, alcohol resistant gel forming foam compound for the first time, whereby a totally new foam concentrate generation was borne. Today, Dr Sthamer is the largest manufacturer of foam in Europe and holds a large number of approvals for its products from independent testing houses across the world ensuring they are suitable for use on fires involving aircrafts, ships, wild-land and buildings alike.

Dr. Sthamer has been represented in the UK and Ireland by Angloco Limited since 2006. In

addition, as well as the Civil Aviation Authority and members of the Airport Operators Association, UK Petroleum Industries Association and the Tank Storage Association. Angloco's section includes 31 foams across 10 different categories all manufactured by Dr. Sthamer. These include foam concentrates from basic protein foams to the most technologically advanced and ultra-environmental training foams, AFFFs, FFFPs, a complete range of alcohol resistant foams, class A foams and the new Moussol FF.

As part of the framework, Dr Sthamer are capable of carrying out capability tests with other foams to ease the transition from one manufacturer to another and where foams are stored for long periods, perhaps on an industrial site or bulk storage site, Dr Sthamer will carry out recertification tests to ensure foam stocks are still active, eliminating the need to dispose of large stocks of

As part of the framework, Dr Sthamer are capable of carrying out capability tests with other foams to ease the transition from one manufacturer to another and where foams are stored for long periods, perhaps on an industrial site or bulk storage site, Dr Sthamer will carry out recertification tests to ensure foam stocks are still active, eliminating the need to dispose of large stocks of foam once the “use-by-date” has passed.

addition to being the UK's longest established builder of fire-fighting vehicles Angloco is also a major supplier of fire and rescue equipment and supplies. It has particular areas of expertise in the supplying the needs of airports and industrial customers and so a partnership with a foam manufacturer was a natural step.

Firebuy

Angloco has recently been awarded a UK framework agreement for the supply of fire fighting foam concentrates by Firebuy. Firebuy (a UK Government Non-Departmental Public Body) acts as a central procurement body working closely with the National Procurement Board (NPB), English Fire and Rescue Authorities, Regional Management Boards (RMBs) and the Chief Fire Officers Association (CFOA). The foam framework is available for use by all UK public sector organi-

zations, as well as the Civil Aviation Authority and members of the Airport Operators Association, UK Petroleum Industries Association and the Tank Storage Association. Angloco's section includes 31 foams across 10 different categories all manufactured by Dr. Sthamer. These include foam concentrates from basic protein foams to the most technologically advanced and ultra-environmental training foams, AFFFs, FFFPs, a complete range of alcohol resistant foams, class A foams and the new Moussol FF.

Alcohol resistant

Today, alcohols (Methanol and Ethanol mainly) are important ingredients in many standard fuels but especially so in bio-fuels. Rapidly growing in use, currently bio-fuels are mainly constrained to road vehicles but already some commercial airlines have conducted flights using these as a test and they expect their growth in use in the future. The detrimental effect of alcohols or other polar solvents on a standard class B foam layer are well known.

However, visitors to the Angloco technology demonstration day held last October at the UK Fire

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Services College were stunned at just how poor the performance of some class B foams against these fuels could be. Here a standard bio-fuel (E80 petrol purchased from a major UK supermarket chain) was shown to almost completely destroy the fire-fighting effects of a standard FFFP. The small demonstration pan fire simply could not be extinguished. Visitors were then shown the effectiveness of Moussol FF on the same fuel with rapid control and extinction.

ICAO Level B

The recent independent ICAO Performance Level B certification is a major milestone. Level B foams for Aircraft Rescue and Fire Fighting (ARFF) are the norm at most airports as using lower performance level A would require much greater quantities of media and higher application rates (and hence more and or larger vehicles) to meet the regulatory requirements. Unlike other Level B foams such as AFFFs or FFFPs, Moussol FF meets the higher performance level without using any fluorosurfactants.

CAFS

The use of Compressed Air Foam Systems is rapidly growing with the benefits of CAFS now being well known: Smaller and more even bubble size leading to greater cooling efficiency, greater throw from monitors, less water used and less run-off, greater expansion with longer drainage times and greater adhesion of the finished foam to surfaces allowing insulation from radiated heat. Not widely known however is that some foams perform much better than others when used with CAFS. Perversely the high levels

**"If a municipal brigade wants to
standardise on just one foam to cover
most risks or an airport wants to
continue to meet ICAO Level B
performance but improve its
environmental credentials then this
could be the right foam for the job –
it's all about choice and now our
customers have one."**

of fluorosurfactants in very high performance class B foams can cause a "non-stick" effect, removing some of CAFS' greatest attributes for municipal brigade use. CAFS for ARFF vehicles is also growing in use in Europe with vehicles fitted with CAFS continuing to be supplied to both Norwegian and Danish airports.

Viscosity

Moussol FF has a low viscosity compared to other alcohol resistant and "universal" foams and unlike these it is also compatible with most foam proportioning systems and brands available today. Moussol FF is unlike some other AR foams which are thick like treacle or worse are a shear thickening/rheopectic fluid (i.e. they become more viscous the more they are forced). This can create serious short and long term issues for many designs of foam proportioning systems. However, not only is Moussol FF lower in viscosity to begin with but it is a thixotropic fluid displaying a decrease in viscosity over time at a constant shear rate (a bit like a thin tomato ketchup!).

Fluorine free

Concerns about PFOS and PFOA yielding fluorosurfactants are widespread and the fire-fighting sources of these compounds have either already been removed or are scheduled to be phased out of production throughout most of the world. The telomerisation based fluorosurfactants used for decades in other Dr. Sthamer



Austropotamobius pallipes The threatened British white-clawed crayfish

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foams do not suffer the same level of consumer negativity. Independent test indicated these telomerisation based fluorosurfactants have low environmental toxicity and have no bioaccumulation factors from tests carried out in humans. Even so understandable consumer worries continue about any very long term persistent compounds and Moussol FF contains none of these.

Biodegradable

There is little point replacing one persistent compound with another just because it is fluorine free. For that reason Moussol FF has been designed to degrade quickly (approximately 70% has gone within 28 days) but not too quickly as this would give very high BOD/COD. Finished Moussol FF solution (diluted to 3% as for use on non-polar fires) has a BOD comparable with tertiary treated waste water.

Colin Burns, Loss Prevention Officer at GlaxoSmithKline (Barnard Castle) commented on his company's recent decision to purchase the new foam: "We have undertaken the review of our foam stocks, and as part of our Risk Management strategy, we have opted for Moussol-FF-3/6 Foam Concentrate, due to its fire fighting performance and excellent environmental credentials. GlaxoSmithKline is committed to protecting the environment and our use of Fluorine Free Foam in conjunction with other safeguards, will ensure that we maintain our responsibilities and that rare English crayfish in a nearby water course will remain unharmed and will continue to flourish in their natural environment."

Limitations

Can one size really fit all, is Moussol FF a jack of all trades but master of none? Alistair Brown, responsible for new product development at Angloco is optimistic but realistic: "Moussol FF is not as effective on say a large mixed polar/hydrocarbon fires as for example Dr. Sthamer's Omega. Nor is it quite as an efficient wetting agent on a wildland fire as Sthamex Class A. However, if a municipal brigade wants to standardise on just one foam to cover most risks or an airport wants to continue to meet ICAO Level B performance but improve its environmental credentials then this could be the right foam for the job – it's all about choice and now our customers have one".



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Multi-wear multi-threat CBRN protection to effectively fight bio-terrorism

Spain and Britain have suffered attacks. Countries beyond Europe such as Japan and the USA have suffered attacks. Responding to expert opinion regarding the increasing and very real risk of a bio-terrorism attack within any of the nations in Europe, the European Commission has unveiled proposals calling for an exchange of information between nations and a consolidation of equipment and training for emergency workers to boost the continent's defences against a bio-terrorism or 'dirty bomb'.

EU Justice Commissioner Jacques Barrot states "Terrorist groups acquiring weapons of mass destruction, including CBRN (chemical, biological, radiological and nuclear) materials is the most frightening scenario." The proposals, underpinned by an EU action plan, include steps on how to detect materials, how to respond quickly and efficiently, how to protect dangerous materials and manage risk, and how to train emergency workers to save lives and limit damage. In Barrot's words, "we cannot be complacent."

A world leader in CBRN PPE, Lion Apparel appreciates the operational needs of fire fighters across the globe and is proactively responding to the shifting nature of the threat. For Europe, Lion Apparel has devised a CBRN protection garment which blends the protection properties of its successful MT94, a proven garment choice for fire services across the USA, with Europe-specific design details. The resultant "MiTE" is one of the most versatile, lightweight, comfortable easy on/easy off CBRN protection garments in Europe. It provides one of the highest protection levels for any single layered garment on the market, delivering optimum protection integrity whilst making available highly convenient functionality, enhanced mobility and dexterity and permitting very fast donning (under 5 mins) and doffing. Utilising WL GORE™ Chempak® Ultra Barrier Fabric, a three-layer construction which provides a lightweight tear resistant barrier against a broad range of industrial and chemical warfare agents, the MiTE allows for a much greater range of unencumbered movement than a fully encapsulated garment, allowing the wearer to crawl, climb and run with significantly less restriction and physiological burden than other garment types. It is ideal for search and rescue operations and incident monitoring. Highly compactable, it can be safely stored for up to 10 years, can be laundered 6 times and can be effectively decontaminated using typical HazMat wet decon methods.

The Northern Ireland Fire Service has recently purchased a garment consignment from Lion and states "There is undoubtedly a wide choice of CBRN garments out there – offering different characteristics which impact on their wearability and ease of use. I believe that a single layer suit is an essential component in a comprehensive CBRN protection arsenal and can play a vital role in search and rescue operations which require a high-comfort, longer use garment."

As the threat constantly shifts focus, Lion is continually working to produce breakthrough



products for USAR and Decon, allowing organisations to select from a range of CBRN protection to ensure optimum capability to meet different incident requirements. Building on the outstanding success of its Technical Rescue Garment produced in conjunction with Strathclyde Fire and Rescue Service, Lion is further developing the TRG's capability to potentially offer CBRN protection capability, underlining Lion's commitment to create the ultimate arsenal of protection for Fire Services. Furthermore, Lion understands the concerns of procurement officers who have to stockpile garments safely for future use and has become renowned for the fully managed service that officers can purchase for complete peace-of-mind. This TotalCare® solution can be tailored specifically to meet the needs of the Organisation ranging from a fully-managed 365 day service to a less formal provision. **IFF**



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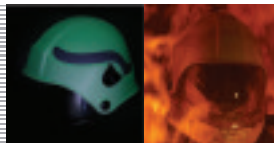
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Firefighters' Personal Protective Equipment (PPE)

Clunk-Click . . . every trip, it's the one sound bite which sticks in every body's mind, and the thought of wearing something to protect you focuses your thoughts. Many of us of a certain age group will recall the message the government here in the UK sent out to us all to encourage us to wear seat belts in our cars, despite the journey length, and all courtesy of Sir Jimmy Saville an aging DJ from Leeds. Oddly enough and despite overwhelming evidence it was another ten years before it became law, the wearing of seat belts can save lives and protect the occupants of a car in the event of mishap. Was this the birth of risk assessment?



By Chris Piercy

Commercial Director,
Images at Work

The process of evaluating the need to protect our bodies from the environment had to change in a dramatic and comprehensive way. The pace of life and the expectation of what we can do with these frail and vulnerable shells we call bodies, has shown that care was needed, more so now than ever. Mortal danger and injury was on the increase as we pushed ourselves beyond the boundaries of the past. Not only was personal risk involved, there was the legal implication for both employees and employers. New laws and legislation protect our futures, we now understand risk assessment, duty of care, fit for purpose. We have come a long way in the last thirty years. Unfortunately we had to learn the hard way, there is little room for smug reflection, and as with so many lessons learned in life there have been many sacrificial lambs! Seat belts protect you from the possibility of accidents, PPE however is there to protect you when you know you are at risk, through hazard of occupation or environment. Car manufacturers build better, safer cars, with seat belts. We cannot re-design our bodies, so we have used our history and experience together with engineering skills to create a range of PPE components to protect us.

The advancement of PPE design does create a dilemma; it can be a play off between protection and compromise. Body Armour will protect you from a knife or a bullet, but it can be heavy to wear, and does bring with it problems related to heat and mobility. The same can be said for

Firefighters' PPE, it needs to be designed to protect the wearer from heat and water but at the same time allow mobility and comfort. Prior to the high tech garments of today, Firefighters in the past were issued with PPE of a very low standard, and they relied on their own pain barriers to assess whether to stay or move back. The slow and consistent burning of the ears being their first line of defense should the situation start to become dangerous or life threatening. The reliance on natural material such as wool and leather as the only barrier between them and injury would not

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be acceptable in today's world of Fire and Rescue. More worrying adversaries, such as blood born infections like AIDS or Hepatitis now supercede the risk from heat and flame. Plus, in this threatening world we now live in, the possibility of terrorist activity increases the burden on the first responders, in particular the firefighter who now performs a fire and rescue role to many areas of the community. This is not just in the town and country, but at Airports, Power Stations, at sea, and in all regions of the world.

In the UK the 57,000 men and women who make up the nations Fire Brigade are equipped with all the latest pieces of technology the UK Government and Fire Authorities can source. PPE, which now includes a sophisticated helmet with eye and ear protection, a Formula One style flash hood, together with specialist gloves and boots help to make up the total ensemble.

The selection of the correct PPE is now achieved through detailed and technical assessment and for many countries and regions in the world where the ambient environment plays a leading element in the process. In the UK we enjoy temperate conditions with seasons which currently drift between -3 centigrade to +26 centigrade, and of course a good amount of rain fall. Firefighters in the UK now work within their well-established watch system (a reflection of the Navy, from where the system was derived) are never sure what they will be encountering when they attend a call. From the sublimely easy to the most dangerous, from a cat up a tree, to a multi vehicle accident on a busy highway . . . and in all weather conditions!

In the UK the 57,000 men and women who make up the nations Fire Brigade are equipped with all the latest pieces of technology the UK Government and Fire Authorities can source. PPE, which now includes a sophisticated helmet with eye and ear protection, a Formula One style flash hood, together with specialist gloves and boots help to make up the total ensemble. However, the main defense for what they are about to encounter will be their EN469 Firefighters suit. No matter what befalls the firefighter as he/she disembarks from the fire appliance, this collection of tried and tested products will be there to protect them.

However, caution is still needed, and rules of engagement have to be applied, as PPE can also be a danger, and problems relating to core body temperature and heat exhaustion must be considered. There is no other choice for the Brigades but to send the Firefighters out in this all-encompassing survival package. To provide an alternative to the current PPE issues does in its self pose concerns. There are other forms of fire retardant garments available, for example the soon to be defunct EN531 (replaced by EN ISO 11612), lighter in weight, but not intended for structural firefighting, and offering no protection against water or blood born ingress. This weight of garment has been considered, and in some Brigades adopted for training purposes, in particular Airport Brigades and Military airside sites.

The EN 469 (2005) suits have been upgraded through the years; in the UK we are now at certification 2005, and with concerns that the suit needs to be suitable for all applications, we have striven to enhance the Firefighters apparel into a more durable product.

With the arrival over the last two decades of this more sophisticated 'turn out' gear, consideration as to the best PPE to send out on a run has grown with levels of technology, and also encompassed the duties of the Firefighter and his/her increased responsibilities. Fire kit has advanced in many areas, helmets for example bear more resemblance to Fighter Pilots helmets, some even incorporating radio equipment for keeping in contact with other team members and the inci-



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dent commander. Two piece visors, which also protect the eyes when using cutting equipment, essential when attending road traffic collisions (RTC's). Add to this the balaclava style flash hood (EN 13911), and burning ears become a relic of the past!

The EN 469 (2005) suits have been upgraded through the years; in the UK we are now at certification 2005, and with concerns that the suit needs to be suitable for all applications, we have striven to enhance the Firefighters apparel into a more durable product. The outer fabric is available in a range of colours and weights, some incorporating Kevlar, and all have fluorocarbons to assist with

**Washing on station is now
frowned upon, as
temperatures both during the
washing and drying process
have to be monitored carefully
to ensure garments are not
damaged, and all contaminants
are removed.**

water run off. In the battle to make the suits lighter, the replacement of wadding to protect from the heat, and in order to make the suit breath, air gap liners have provided astounding results in thermal protection. In addition to this thermal protection the moisture barriers are far more efficient, removing the concerns of scalding on the inside, or boil in the bag as it is often referred to!

Gloves have also made a quantum leap in both protection and dexterity. Incorporating Kevlar and waterproof linings, these new generation gloves are winning approval at all levels both from Firefighters, and Senior Officers, as the durability in all aspects of operation has reduced the number of hand injuries encountered. In addition to structural fire gloves and focusing on RTC, the introduction of new lighter gloves for use away from fires has also appeared which gives a much higher dexterity, useful when using cutting equipment.

Finally, the footwear worn by today's Firefighter, be it rubber or leather; bears no resemblance to a bygone age when the boots were either leather or robust garden Wellington's. Toe and sole protection and the ability to protect from intense heat make today's leather boot very acceptable to the modern Firefighter, whereas if the call is for flood work, the new rubber boot with toe and sole protection gives the officers on the ground a choice before engaging with the task at foot.

But as with all things sophisticated, the after care and maintenance becomes ever more critical in particular with tunics and leggings. There are now regulations in keeping with this requirement, the PPE at Work Regulations 1992 (as amended), which together with operational procedures laid down by the Brigades, ensures the PPE is maintained to a high level. Washing on station is now frowned upon, as temperatures both during

the washing and drying process have to be monitored carefully to ensure garments are not damaged, and all contaminants are removed. Too much heat and the components out of sight inside the body of the garments could break down; too cool and the garments are not clean. The drying also has to be administered with care, tumble-drying can do serious damage to the layers within the garments and the hi-vis tape and other outside features, both from friction and concentrated heat can cause break down. Again not enough heat and the chemicals which make up the water repellency are not re-generated.

During recent years the questions of total after-care has been addressed by out sourcing this to companies in the private sector. Some are very good at cleaning, but when it comes to cleaning and repair there appears to be very little to choose from. The skill and equipment needed to perform what in some cases is major surgery is in short supply. If a garment is holed, to darn or stitch is deemed not acceptable, and some Brigades now insist on the entire panel being removed and replaced. The layers inside the garment further complicate this procedure, so again specialist equipment is employed to ensure that the garment returned to the Firefighter is still fit for purpose.

The work carried out on the garments has to be accompanied by a transparent reporting system, both for the Brigade and the Managing Agent/Laundry contracted to carry out this essential work. It is paramount that a garment does not become beyond economical repair (BER), but a good Managing Agent working in partnership with the Brigade can ensure that this does not happen, whilst keeping the expenditure under control.

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If PPE items are not maintained and monitored the consequences can have far reaching implications at all levels. With the regulations in place, together with more recent laws such as Corporate Manslaughter and Corporate Homicide the 'ignorance is bliss' syndrome can no longer be called into play.

There are no more excuses, companies are taking this duty of care very seriously and some do provide a world class service to Brigades of all sizes. This has grown out of the demands now being put on Firefighters all over the UK, who must have first class garments, fit for purpose, for all eventualities . . . for every trip!

IFF

Chris Piercy is Commercial Director of Images at Work based in Salisbury Wiltshire England, following an MBO in 1999.

While the company enjoys balanced collection of private sector customers, RAC and DPD to name two, Chris with his dedicated team have sought to make inroads in to the Emergency Service, in particular the UK Fire Brigades.

With a number of selected partners this has been achieved. With the benefit of a unique Management System and a growing knowledge, Chris and his team at IAW are poised to provide a world class service to a number of Brigades in the future, "its not all about fire kit", is Chris's vision, "fire kit is only as good as the last wash/repair".



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Potable Water Around the World

Potable drinking water is produced in the country of Curacao primarily through the reverse osmosis process. Reverse osmosis provides nearly 100% of this nation's fresh water needs. Other areas of the world, such as the Murray River valley in Australia, are also troubled by lack of fresh water. Whether caused by over-farming or climate change, these conditions exist. The need for fresh clean water is self evident.

Michael C. Ruthy, P.E.

VP – Engineering,
Pump Division
W.S. Darley and Co.

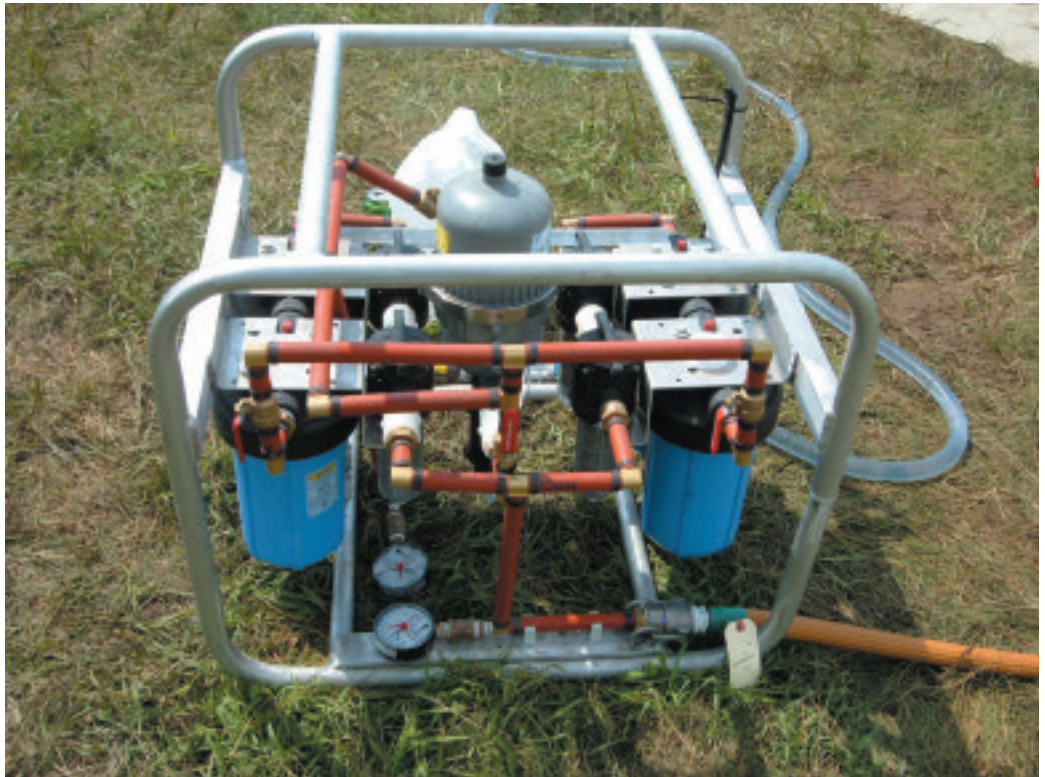
Observing these facts, and conditions around the world, including many natural disasters and weather phenomena, led us at the Darley Company to believe that the emergency response teams in select areas might want to have some new tools at their disposal. Being able to dispense drinkable water during a flood, or a wild-land incident, or a military maneuver, is of obvious value. How these systems work is an important aspect to understanding how they could benefit your response efforts.

The simplest systems perform only two tasks: Filter the water to eliminate colloidal suspensions and improve turbidity, and disinfect the water to eliminate biological hazards. The filtering is accomplished with carbon filters, which filter down to 1 micron particulates. The carbon also chemically binds hydrocarbons and volatile chemicals, if present in small quantities. Water that passes

through the filters then travels to the disinfection device. In the simplest systems, ultraviolet (UV) rays are used to kill all bacteria, viruses, and molds. They are simply fried to a crisp and neutralized by the electromagnetic radiation. This method is quite suited to apparatus that is designed to deliver water immediately, such as a truck at a wildland fire, which could use virtually any fire scene source of water to create clean, safe drinking water. It would also prove invaluable for disaster relief due to freshwater flooding.

If the dispensed water needs to be stored for use at a later date, a chlorine injection system is recommended. Once the water passes the UV disinfection, it is fit for consumption, but if it is going to be stored, the likelihood it may be in contact with air and run the risk of contamination from spores, pollen, and other airborne hazards are too great. Chlorination is recommended for all systems

Pre-filtration module eliminates suspended and dissolved particles down to 1 micron



that dispense water for consumption more than 24 hours in the future. Unchlorinated water may still be suitable for food preparation when the water is boiled, if stored past this limit, as well as for other, non-consumable applications.

For those faced with salt water, the system needs to jump a level of complexity with the addition of a reverse osmosis system. Reverse osmosis is a process where pressurized water containing high levels of Total Dissolved Solids is passed by a semi-permeable membrane that allows the water molecules to pass through, but the dissolved solids, including salts and other

larger molecules, are blocked. In some military systems where they want to be prepared for any water source on earth, including the Dead Sea, these systems require extremely high pressure, on the magnitude of 1200 psi. For systems that only require ocean water, or brackish water, the systems are simpler and less expensive, as less pressure is required.

For our military applications, we also offer a coagulant settling tank ahead of the filters, to ensure long filter life even when drafting from sources unfit for civilian use. We can also add cyclone separators to improve the efficiency of cleaning turbid water sources. Again, these elements would not be necessary for most civilian applications. For areas with very critical response needs, we do offer systems that can neutralize Nuclear/Biological/Radiation contaminants as well. For hazmat teams we offer decontamination systems, with the ability to treat the water used during the decontamination process, after decontamination is complete, without the need to bring in separate vehicles.

Coastal Fire Departments especially should consider their ability to respond to the need for fresh water on a large scale, and hopefully FEMA and other agencies will recognize the need for such vehicles in high risk areas. The fact that we can now easily and inexpensively add such an important function to many emergency vehicles is worth considering for your next vehicle purchase, and this added capability may make your department more eligible for grant money through FEMA's grant programs.

It makes sense that Emergency Services should be able to dispense clean drinking water in the event of a crisis – a crisis that seems more common every day.

None of these technologies is new or unproven. Many cities have water purification systems for



Reverse Osmosis module eliminates salt and biological hazards

providing drinking water to their citizens. I believe New York City draws its drinking water supply directly from the Hudson River, and can treat it to the point they can dispense it to millions of people without chlorinization. That has to be a sophisticated system. Many companies we work with, like LaBarge, are supplying smaller units designed for the military, able to be deployed from the back of a Hummer and capable of high volume flows. Pierce Manufacturing, among others, built some concept vehicles that provided water purification for emergency events, but it never really gained market acceptance. No one wanted a stand alone vehicle that did nothing but wait for an emergency that might only happen once a year at best. Then we had Hurricane Katrina in New Orleans, Louisiana.

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Katrina's devastation really pushed the limits of our emergency responsiveness, and led a renewed review of how we can provide fresh water in crises. The costs and logistical difficulties of distributing bottled water are staggering, and it depends on outside help, which can't always get to where it needs to be. Since the time of Pierce's concept vehicle, water purification systems have gotten smaller and smaller, and by utilizing the fire pump, and even the tank of the fire truck to which these smaller systems are installed, space is further constrained. A system that can dispense 20 GPM takes up one small compartment. During an emergency that disrupts water services, this truck could use the fire pump to fill the tank, and then drive to a distribution point, if access to the water's edge was not open for the public.

A few years ago, I got to take a trip to Australia to visit some customers and was hosted by our representative there, Trevor Wing. He took me to



Chemical injector can inject chlorine or anti-scalant solution

several cities, including Canberra, where we did some Class A foam training with the local brigade, and I got to see some of the devastation after their recent wild fires. It was mind boggling to drive 30 miles into a burnt up forest and then turn around because there's no point in seeing more. Canberra's test area was the municipal waste water treatment plant, and after our foam tests, I got to take a quick guided tour of the facilities. They were quite remarkable.

At the end, after all the agitation tanks, microbial action tanks, filtration, and incineration of dried waste, the water exited through a weir in the wall, and fell in a cool, clean waterfall to form, what they told me, was the headwaters of the Murray River. Later that trip I got to Adelaide, and got to see the mouth of the Murray River, with its sea gate closed to keep the water from coming in. It's a sight I think we'll be seeing more of, all over the world.

That memory was special, but I'm glad we don't need an incinerator on a fire truck. That leads to too many jokes about the term "Fire" Truck. **IFF**



Michael C. Ruthy, P.E., is the Vice President of Engineering for W.S. Darley & Company's Fire Pump Division, a position he has held since 1996, having started at Darley in 1989. He was graduated from Lafayette College in Easton, PA in 1985 and previously worked at Hale Fire Pump Company.

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New P.A.S.S. Standards Enhance Firefighter Safety

By Craig Walker

Division Chief (retired)
Prince George's County,
Maryland Fire
Department

Firefighting has always been one of the most hazardous professions on the face of the earth. Since the beginning of the modern fire service, each emergency incident continues to pose its own set of circumstances and challenges, and its own unique array of hazards and personal risk to firefighters. Firefighters everywhere recognize the peril of rushing into a burning building, where visibility is next to zero, where team members in close proximity cannot be easily seen, and where unanticipated conditions could kill or injure in moments.

Since firefighter death and injury statistics have been recorded, one phenomenon continued to persist in the analyses of line of duty deaths – firefighters becoming lost or separated from crews in buildings. All too often, the fact that these firefighters were unaccounted for was discovered far too late to provide the assistance that would have maximized their chances for survival. In the 1980's, the fire service as a community began efforts to provide better personnel accountability at the incident scene. Thus, passport systems, personnel accountability tags, Velcro tags, and barcode systems found their way into the fire service.

A Brief History of PASS

Personal Alert Safety System (PASS) devices have been in the fire service for over 25 years. The rapid growth in the various technologies affecting the fire service, from longer duration self-contained breathing apparatus and improvements in the protective clothing envelope also caused an interesting evolution in PASS technology. A brief history of this evolution follows below.

In 1980, the National Fire Protection Association's (NFPA) Technical Committee on Protective Equipment for Fire Fighters responded to requests from the fire service concerning requirements for a safety device that would emit an audible signal if a firefighter became injured or incapacitated. The first edition of the NFPA Standard 1982 on Personal Alert Safety System (PASS) devices was released in June of 1983.

The early PASS devices were manually activated, and were required by the standard, in summary, to meet these criteria:

- Provide a means of activation and deactivation that required two separate and distinct motions (intended to prevent inadvertently turning the PASS device Off).
- When in the Alarm mode, the PASS had to emit a discernible audible sound and provide a means of visual notification that the unit was in Alarm and a firefighter was in a MAYDAY situation.
- Have a means of enabling the firefighter to manually activate a 'Call for Help' Alarm, causing the PASS device to emit the audible



The first version of Grace Industries' PASS Device. This model was manufactured in the late 1980s

sound signature and visual alert, which was intended to alert other personnel that a firefighter was in a MAYDAY situation.

- Have a means of detecting the lack of motion of a firefighter in the event that he or she is incapacitated and cannot activate the 'Call for Help' Alarm function, thereby initiating the audible and visual Alarm automatically.

First generation PASS devices provided a step in the right direction, but had some inherent weakness, largely due to the technology that was available for their manufacture. The lack of motion sensing function was often performed by mechanical means and was often difficult to reset, making PASS subject to 'false' Alarms. Units were often switched to the off position due to the nuisance of these false alerts. Early PASS devices were manually

The second iteration of the SuperPASS, this model compliant to the 1993 edition of NFPA Standard 1982



activated by the wearer, a critical step that was often forgotten or overlooked, resulting in firefighter deaths where a PASS was being worn, but was not turned on.

Subsequent editions of NFPA Standard 1982 (1988, 1993, 1998 editions) created new testing criteria designed to improve PASS technology. Some of the key issues addressed were sound discernibility, flame spread testing, water resistance when heated, and lack of motion sensitivity to name a few. In August, 1998, the fourth edition (1998 edition) of NFPA 1982 became effective.

Early PASS devices were manually activated by the wearer, a critical step that was often forgotten or overlooked, resulting in firefighter deaths where a PASS was being worn, but was not turned on.

Perhaps the most significant improvement in the requirements was a requirement that PASS be switched from the off, or "storage" position, to the on, or "motion sensing" without any independent action by the wearer. The 1982 Committee, in concert with the fire service community, recognized a need to address this problem and drafted the "Auto-On" provision in an effort to eliminate instances wherein PASS were worn by the firefighter, but not activated.

The committee exercised great care in writing this new function in order that the language not be design restrictive, but gave examples of methods by which "Auto-On" could be accomplished, such as air activation, activation by pull away tether, electronic means, or any other means as determined by the manufacturer.

Each of the manufacturers of PASS developed

their own method for achieving Auto-On. These methodologies fall into 3 distinct categories:

- 1 Fully SCBA Integrated** – These PASS systems are built as an integral part of the self-contained breathing assembly. The PASS component is activated, or switched from the "storage" (off) to "motion sensing" (on) mode automatically when the air cylinder is turned on. The PASS cannot be switched back to the "storage" (off) mode until the air cylinder is turned off. The SCBA must be worn at all times when PASS protection is desired.
- 2 SCBA Integrated/Removable** – These PASS systems are similar to fully SCBA integrated systems in that the PASS device is activated, or switched from the "storage" (off) to "motion sensing" (on) mode automatically when the air cylinder is turned on, but they can also be removed and function independently as a stand-alone PASS. This type of system affords PASS protection for those operating outside the IDLH (Immediately Dangerous to Life and Health) environment. The SCBA Integrated/Removable PASS cannot be switched back to the "storage" (off) mode until PASS is returned to its holder and the air cylinder is turned off.
- 3 Stand-Alone PASS** – The stand-alone PASS functions as its name implies, which means that the PASS can operate without the aid or assistance of SCBA or any other device. It is attached to the firefighter's protective clothing, SCBA harness, or other means and functions, and is automatically switched from the "storage" to "motion sensing" mode without any independent action by the wearer. The most prevalent means of accomplishing this is by means of a pull away tether. The stand-alone PASS provides protection in all operational conditions whether SCBA is in use or not.

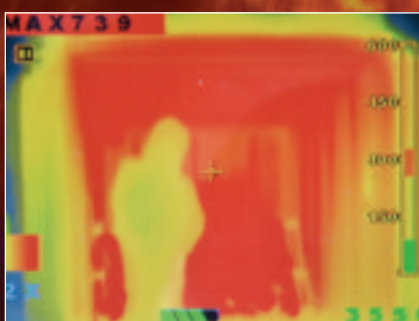
NFPA Standard 1982 (2007 edition) requires Auto-On functionality, but **does not** require that PASS be integrated into SCBA systems.



Grace Industries' SuperPASS II, this model was compliant to the 1998 edition of NFPA Standard 1982

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New PASS Problems Identified

In October, 2002, the Technical Committee on Electronic Safety Equipment (ESE Committee) was established. Part of this new committee's responsibility is to review and establish standards for all electronic in emergency responder equipment. The purview of the ESE Committee now includes Standard 1982 (PASS).

During the time period when the 2007 edition of the 1982 Standard was being drafted, some potential problems with PASS presented themselves. In the latter part of 2005, the NFPA reported that the National Institute for Occupational Health and Safety (NIOSH) had presented an analysis of four firefighter fatalities occurring over the time period of 2001 to 2004 which indicated that the audible PASS Alarm signals were barely audible or not heard at all. The PASS devices in question were all compliant to NFPA 1982 (1998 edition and earlier editions).

The National Institute for Standards and Technology (NIST) conducted extensive research into this phenomenon and discovered that sound reduction began to occur at temperatures as low as 300°F or 150°C. It was discovered that the PASS, when allowed to cool, would emit acceptable sound levels. This problem presented itself when physical changes to the PASS device occurred at higher temperature levels.

The committee also addressed the problem of water intrusion into the electronics and/or power supply compartments. As the reader may imagine, water coming in contact with critical electronic components of the PASS could easily cause the

PASS to function improperly or not at all. It was determined that the most likely cause of water intrusion was the vibration that PASS devices are subject to while during emergency response and routine vehicle travel. Regardless of the type of PASS, (Fully SCBA Integrated, SCBA Integrated/Removable, or Stand-Alone), the cumulative effects of bouncing around (even while properly secured) could negatively impact the integrity of the devices.

In an effort to maximize the effectiveness of PASS, and reduce or eliminate inherent conditions that might present difficulties for firefighters and emergency responders in emergency conditions, the committee took a hard look at potential issues caused by sound "muffling". The idea is that sound muffling could occur when a first responder became incapacitated or unconscious, and became positioned in such a way as to muffle the sound ports on the PASS. In such a case, the sound pressure of the audible Alarm could easily become significantly reduced, making it much more difficult for other personnel to distinguish the Alarm and respond to the MAYDAY situation.

Addressing these types of technical problems presented significant challenges to the 1982 committee. Like many other technological challenges, identifying problems or deficiencies is often the easiest task. The real difficulty lies in creating test protocols that eliminate the deficiencies. A great deal of hard work went into the creation of a new edition of Standard 1982 that would significantly reduce or eliminate these problems, and thereby greatly enhance the life safety of emergency services personnel.

On February 9, 2007, the NFPA issued a NFPA Alert Notice Update in which is provided a summary of PASS performance issues and the steps that were taken to address these issues. Excerpts from this NFPA Alert Notice Update follow, and provide a comprehensive overview of the requirements of



The first transceiving (2-way signaling PASS). This model was compliant with the 1998 edition of the PASS Standard

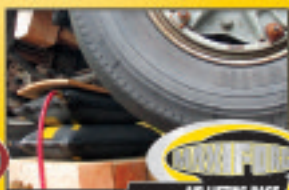
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The SuperPASS 3 is Grace's latest model PASS. It meets or exceeds the requirements of NFPA 1982 (2007 edition)



the 2007 Edition of the 1982 Standard:

In late 2005, NFPA published an alert notice entitled "PASS alarm signals can fail at high temperatures" on the NFPA Web site advising emergency responders, especially fire fighters, of high temperature exposures causing the loudness of PASS alarm signals to be reduced. This reduction in loudness can cause the alarm signal to become indistinguishable from background

noise at the incident scene. This problem was brought to the attention of the NFPA Technical Committee on Electronic Safety Equipment by the National Institute for Occupational Safety and Health's (NIOSH) Fire Fighter Fatality Investigation and Prevention Program.

NIOSH reported that during the investigation of four fire fighter fatalities that occurred from 2001 to 2004, the PASS alarm signals were not heard or were barely audible. The PASS had been certified as compliant to NFPA 1982, Standard on Personal Alert Safety Systems (PASS), 1998 Edition, and involved both stand-alone PASS and SCBA-integrated PASS.

Laboratory testing of PASS by the National Institute for Standards and Technology's (NIST) Fire Research Division has shown that this sound reduction begins to occur at temperatures as low as 300°F (150°C) and affected all PASS evaluated by NIST that were certified to the 1998 edition and earlier editions of NFPA 1982.

The new, 2007 edition of NFPA 1982

The alert notice reported that the NFPA Technical Committee on Electronic Safety Equipment (the Technical Committee), in cooperation with NIOSH and NIST, was studying the issue and would incorporate revisions into NFPA 1982 as solutions were developed and consensus around addressing the issue was achieved. The Technical Committee has now completed the new, 2007 edition of NFPA 1982, which contains revisions providing for strengthened performance require-



thinking without limits



More than

ments and testing addressing the alarm signal degradation issue identified in the alert notice. The new edition also addresses other issues that have been brought to the attention of the Technical Committee by NIOSH and others, including problems caused by vibration, probably during transportation, and water ingress into the electronic and power supply compartments. The principal changes contained in the 2007 edition of NFPA 1982 are summarized as follows:

- 1** new water immersion requirements and testing for PASS where PASS is exposed to 350°F for 15 minutes and then to water submersion in 1.5 meters (4.9 ft) also for 15 minutes for each of 6 cycles; and PASS examined to determine no water ingress, all PASS signals must function properly, and electronic data logging functions must operate properly; following this, PASS is re-immersed in the test water for additional 5 minutes with the power source compartment(s) open, and following the 5 minutes the PASS is removed from water and wiped dry, then the electronics compartment is opened and examined to determine no water ingress;
- 2** new high temperature functionality requirements and testing to now have PASS mounted in a circulating hot air oven at 500°F for 5 minutes and the PASS alarm signal must function at or above the required 95 dBA sound level, electronic data logging functions must operate properly, and no part of the PASS can show evidence of melting, dripping, or igniting;
- 3** new tumble-vibration requirements and testing



The T PASS 4 is a 2-way signaling PASS, which meets or exceeds the requirements of NFPA 1982 (2007 edition)

for PASS where PASS is “tumbled” in a rotating drum for 3 hours and the PASS alarm signal must function at the required 95 dBA sound level and electronic data logging functions must operate properly; new “muffling” of the alarm signal requirements and testing for PASS where PASS is mounted on a test subject and evaluated in five positions (face down, arms extended,



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supine left, supine right, fetal right w/knees drawn to chest, fetal left w/knees drawn to chest), and the alarm signal must function at or above the required 95 dBA sound level

Continued reporting of PASS performance issues encouraged

The Technical Committee anticipates that further knowledge concerning PASS performance will be gained as PASS designed and certified to the 2007 edition of NFPA 1982 become available and are put into use in emergency conditions. The Technical Committee, in cooperation with NIOSH and NIST, will continue to monitor the performance of PASS in order to assure that any issues and developments can be addressed through further revisions to NFPA 1982 as appropriate. Emergency services organizations and emergency responder personnel can greatly assist in this monitoring activity by reporting any PASS malfunctions and other problems with proper functioning of PASS directly to both the certification organization whose certification mark appears on the PASS, and to NIOSH – NPPTL (NIOSH – NPPTL, the National Institute for Occupational Safety and Health – National Personal Protection Technical Laboratory).

(Source: NFPA Alert Notice Update – February 9, 2007)

In the same Alert Notice Update, the NFPA also issued strong recommendations for fire service and other users of PASS:

In spite of the problems with PASS, NFPA believes that PASS remain an important tool for

fire fighters and other emergency responders.

NFPA recommends that, at least until PASS designed and certified to the new 2007 edition of NFPA 1982 become available, emergency responders continue to maintain and use existing PASS. Users are cautioned, however, that both the existing as well as the new PASS (when available) should always be considered a last resort call for help for emergency responder personnel who are unable to otherwise notify others that they are in distress.

Fire fighters and other emergency responders should continue to activate and wear PASS whenever in hazardous areas of any incident, but should also be aware of the possibility that hostile conditions may adversely affect the operation of PASS. Incident command should continue to apply all personnel accountability measures at all incidents to assure the safe entrance and exit of personnel from hazardous areas. Direct supervision of operating companies or teams should provide for the safe operating locations of personnel and ensure that members do not “freelance” on the incident scene.

(Source: NFPA Alert Notice Update – February 9, 2007)

While the 2007 edition of NFPA Standard 1982 posed varying challenges to the companies that manufacture PASS systems, the end result is that the paramount mission – **protecting and enhancing the life safety of the first responder community** was the driving force behind these significant changes.

IFF

Craig Walker is a retired Division Chief, retiring after 25 years of active service in the Prince George's County (Maryland) Fire Department. Craig is currently Vice-President of Grace Industries, Inc., manufacturer of the SuperPASS® 3 and TPASS® 4

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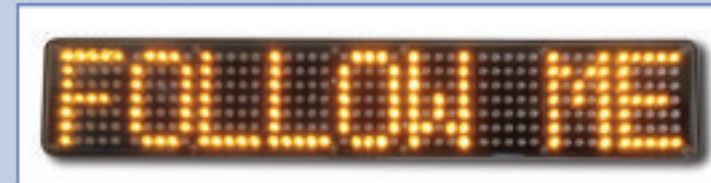
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Dinosaurs are extinct? – Not in the foam industry



By Steve Smith

Progress is inevitable, no matter where you care to look for example jet engines replaced propellers and combustion engine cars replaced horse drawn carts. Thankfully progress and betterment cannot be stopped but always the biggest hurdle to new innovative technology is the “dinosaur”. They constantly tell us “it can’t be done”, “change is not necessary”; it’s always easier to find a reason NOT to do something. Innovation, development and forward thinking takes time and effort; better to save energy and become a dinosaur then?

Couple the need to progress, where lack of doing so could cause permanent damage to our planet and the need to ensure that we are always using the best available technology; it is obvious, we must not let the dinosaurs have the last word. I recently heard a dinosaur constantly shouting “AFFF ATC is the best foam in the world” over and over again and I had no intention of arguing. “AFFF ATC is the best foam in the world” if you want to permanently damage our planet.

What we should do is ask ourselves “what is it we need” both in a practical/operational sense and as a ‘responsible’ citizen. I have never met

anyone that has actively said they don’t care about our environment and who would go out of their way to damage it, so that is a given then, of course we all want to stop the damage being done.

Now we must ask “can we still achieve our objective”? Can we successfully extinguish a fire safely without causing permanent environmental damage and what measures can we use to ensure our goal”?

Using new State of the Art technology Solberg Scandinavian was the first of four foam manufacturers to successfully design and manufacture PFC free foams that will extinguish all types and classes



of fire yet still comply with the requirements of International Environment Agencies. Using their vast knowledge and experience in manufacturing AFFF's in the past, it took a team of highly respected chemists in our Research & Development department, to find a permanent solution to this problem.

Fire Fighting foams were originally manufactured using proteins obtained from crushed bones and blood and other organic parts of animals, pigs, cattle even horses and at the time it was considered to be the best available. Fire fighters thought it was the most "innovative" product they had ever seen.

In the early 1970's another forward thinking company, introduced a new innovative product which transformed the way fire fighting foams performed, it was revolutionary and changed foam fire fighting over night. Their new synthetic Aqueous Film Forming Foam (AFFF) was "perfect" and consequently the manufacturers of protein foams had to include this new 'magic' ingredient into their own products and this created Film Forming Fluoro Protein (FFFP) and Fluoro Protein (FP) foams. However after 30 years of using this new 'magic' ingredient we now know it is doing permanent damage to our planet and so much so that the original developers have stopped manufacturing it. Had they known 30 years ago the damage they were doing it is unlikely it would ever have come to market and fire fighters would still be using Protein foams. Of course you will hear that the alternatives are not as bad as the original but they all contain PFC's. The phrase to look out for is "not as bad as" meaning it is still bad; it just takes longer to do the same damage. There are no safe limits for PFC's regardless of what they are called (PFOS, PFOA, 6:2 FTS, 8:2 FTS, Telomers). The only solution is PFC free foams, described by some as Fluorine free.

The myths surrounding the fire and environmental performance of PFC free foams are often exaggerated and started in order to "muddy the waters" and confuse all concerned, in fact rarely do they have any substance.

The most common are that PFC free foams do not have the same fire performance as other foams and should be relegated for use on minor fires but this is definitely not true. The only measure of a foams fire performance is through rigorous testing using well tried and trusted test protocols. In my opinion the toughest of all these tests is in accordance with the LASTFIRE test protocol. This test is NOT an approval but a means by which every batch is tested to ensure the end user gets a high quality top performance foam on every occasion. It does not allow for one foam to be tested (perhaps specially prepared for the test) to obtain a "pass certificate" and then never be tested again like all other tests and approvals. It is a test that AFFF, FFFP, FP and the AR derivatives, often fail and this is especially the case when the tests are done with tap and sea water. Surely if a PFC foam could pass the LASTFIRE test protocol, which is designed for testing foams that are used on Large Atmospheric Storage tank fires, the worst case scenario in the petro-chemical industry, then there can be no argument to its fire performance qualities. Solberg RF3x6ATC, a PFC free foam, has passed with several different batches from a total of 180,000 litres on all three nozzles using tap and sea water. No other foam, whether they are AFFF, FFFP, FP or their AR derivatives, can boast the same. Solberg RF3x6ATC a PFC free foam is the only one in the world to pass this rigorous test so conclusively. However, like all foams it must be noted that there are good and bad PFC Free products, without doubt the end user must insist on an acceptance test before committing to any foam, using test criteria that is relevant to



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their needs. Any respectable foam manufacturer will demonstrate the fire performance of their products without restrictions.

Another common myth is that PFC foams need to be replenished more often. In my experience good quality PFC Free foams tend to retain their water longer allowing the blanket to remain stable for much longer periods but anyhow the most important aspect about a foam is that it puts the fire out, if replenishment needs to be done more frequently is that good enough reason to pollute our planet?

Solberg Scandinavian is at the forefront of technology and innovation and it is the responsibility of other foam manufacturers and pressure must be put on them by the end users, to catch up. Solberg's new RF product can be used through non aspirated branches or nozzles, through low expansion branches and nozzles, through medium expansion branches and nozzles and even through Hi-Ex equipment with a ratio of 500:1.

Fire fighters safety is paramount and using Solberg RF PFC Free foam through a hand held branch or nozzle, will enable a fire fighter to attack a fire from a safe distance and give him the opportunity to progress through the most difficult of fires with the knowledge he can use all the functions of the branch or nozzle, jet, spray or cone. Fires will be extinguished fast and effectively without the fear of re-ignition. Solberg RF gives the fire fighter the combination of a rapid knock-down capability, experienced with AFFF and the long Burn Back characteristics of a FFFP.

The last myth for consideration is that banded about by the manufacturers of AFFF/FFFP, that PFC Free foams are more toxic than their foams. This is an area where it is very easy to confuse, generally information found on manufacturers Safety Data Sheets is very sparse and very often each manufacturer measure their results using different criteria.

The test species changes, the units of measure are different, it is almost impossible to compare SDS from different manufacturers and come up with a clear answer about the foams environmental credentials. Perhaps this is a contrived policy to deliberately try and confuse? Solberg use a CEN accredited laboratory, not a third party laboratory, to try and standardise what the values are. In layman's terms the issue is "will using PFC Free foams cause long term or short term damage when compared to other foams"? The answer is "PFC Free foams MAY cause short term damage to some aquatic life but these short term problems can be managed in several ways to reduce the potential damage that can be done. There is, however, no long term damage and all water courses will recover in the fullness of time". On the other hand, if a water course is polluted with PFC's, which is found in all other types of foam, the damage is permanent and water courses will never recover.

In conclusion foam users must consider their position on taking a responsible attitude on protecting our environment and that must be balanced with the serious issue of extinguishing hydrocarbon fires. If they consider that it is imperative to use a foam that contains PFC then they must also ensure that the damage they cause is controlled in such a manner that it does not do permanent damage to our environment. That will entail collecting all fire water run-off and disposing of it by high temperature incineration, which can be very costly. Alternatively they can use a high quality PFC Free foam that has a proven Fire performance record and impeccable environmental credentials, removing the need to collect and dispose of fire water run-off.

We cannot ignore that our actions could permanently damage our environment, we must act now and change to PFC Free products; the Dinosaurs must not win.

IFF

Steve Smith has been a fire fighter for 24 years, including 11 years at the second largest oil refinery in the UK. He started with London Fire Brigade in 1974 and then moved to Essex Fire & Rescue Service and then on to Mobil/BP. Steve has been involved with petrochemical fire fighting for a long time and has built up knowledge and experience on hydrocarbon fire fighting on the way. For the past 10 years he is proud to have been part of the team that helped to develop and promote a new PFC Free range of foams at Solberg Scandinavian.

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Building effective risk information collection systems



By Iain Cox

Chief Fire Officer of Royal Berkshire Fire & Rescue Service and Chairman of the National Fire Safety Committee for the Chief Fire Officers Association

It is my opinion that it is now time for a fundamental review of the process for collating and dispersing critical information to the Fire & Rescue Services regarding the composition of buildings. There are three key areas that need to be addressed from the perspective of the Fire Service; firstly to ensure the correct information about the composition of a building is collated; secondly, to ensure this information is communicated to the relevant authorities; finally to assess whether the tests for materials used in the construction of buildings are the right tests. Following this assessment it may be necessary to review Building Regulations to ensure that the right processes and procedures are in place to increase public safety and protect fire fighters.

Before tackling any fire, firefighters carry out a dynamic risk assessment, to judge the most effective way to tackle the incident without unduly endangering the lives of the public or firefighters. Without relevant information on the materials used in the construction of a building, it is extremely difficult to make an accurate risk assessment. Safety equipment available at the site of an incident, such as infrared cameras to detect heat, will not indicate whether toxic smoke is prevalent. If the attending officer on site knew the types of materials used to construct the building, they could make an informed decision based on the likelihood of these materials reacting dangerously when exposed to high temperatures.

Building regulations make it clear that the relevant information on building materials should be logged with and communicated to the relevant authorities, including the Fire Rescue Service. Regulation 16B, recently introduced, specifically states:

"The person carrying out the work shall give fire safety information to the responsible person not later than the date of completion of the work, or the date of occupation of the building or extension, whichever is the earlier."

This regulation requires that fire safety information at the construction phase be passed to the responsible person to facilitate the risk assessment process and to help ensure ongoing fire safety.



However, buildings often change during the construction process, plans are revised, materials and specifications change. The architect submitting the plans may not know what products the contractors on site actually install in a building. A roofing contractor may choose to use materials that deviate from the original specification, either to save money or because they are easier to install. Unless all these elements are recorded, no one party holds the relevant information so this cannot be passed onto the appropriate authorities.

Regulation 16B would appear to be a fair request, however, if the designer doesn't know all the relevant information how can the builder? If the builder doesn't know, how can the owner, if the owner doesn't know, how can the occupier, and if the occupier doesn't know how can the Fire & Rescue Service?

We are also looking at a potential 'time bomb', as these requirements will take time to become embedded and we will retain a large rump of premises where this information was not required and therefore never collected, as detailed below:

"Where a building notice has been submitted to the local authority; full plans have been submitted (regardless of whether they have

been approved); or an initial notice submitted before April 6th 2007, then the requirement to provide detailed fire safety information can be waived regardless of whether the scheme departs from the information deposited."

This means that any there is no requirement to collect, collate or disseminate construction details on any buildings where full plans were submitted prior to April 6th 2007. Nor is there a requirement to record deviations to the initial plans, leaving fire services in the dark about the composition of thousands of buildings across the UK where they could be called to tackle a fire.

In my view it is essential that if the materials or design changes materially during the construction process that these changes are recorded in Fire Safety Information materials. All parties could submit the appropriate records to the Local Council's buildings department for collation. It seems odd that when you buy a £20,000 car you receive a full safety manual, when you buy a £200,000 house or a £2m commercial building you don't.

Council building control departments issue a completion certificate confirming compliance with building regulations prior to a building being deemed operational. If the work is not domestic and involves fire safety, a "Part B certificate" also needs to be issued confirming that the fire safety requirements of the building regulations have also been met. However, completion certificates are rarely seen by Fire & Rescue Services. In my professional experience not all buildings are completed as per the design that is subject to consultation with the Fire & Rescue Service.

The importance of identifying the materials used in the construction of building, particularly large industrial or commercial sites, is reinforced by the tragic case of the De Punt fire. On 9th May 2008, three Dutch fire fighters lost their lives tackling a blaze at a large commercial building situated in a boatyard in the





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village of De Punt in the Netherlands. The municipal authority requested the Nederlandse Vereniging voor Brandweertzorg en Rampenbestrijding [Dutch association for fire service and disaster relief] form an independent Committee of Enquiry. The Committee of Enquiry has not given an opinion as to the exact cause of the fire, but has made a number of provisional conclusions.

A number of these relate to the materials used in the construction of the building, whose roof was made of sandwich insulation panels containing polyurethane foam insulation. The roof was built using coated sandwich panels, consisting of two steel plates 0.4 to 0.5 mm thick, with an intermediate layer of polyurethane foam (PUR) 9cm thick serving as insulation.

The committee reported:

"The sandwich panels used for the roof construction meet the legal requirements for this type of building with regard to the flammability and/or fire development. However, they do bring a huge danger. When heated the polyurethane will produce gases and smoke which may lead to an unexpected and quick spread of fire. Although the dangers of sandwich constructions have been previously acknowledged during fire hazard testing and fire practice, they are not known throughout the fire service."

[N.B. this refers to the Dutch Fire Services.]

The report concluded that while these panels complied with the legal requirements with regard to flammability and/or the spread of a fire, they also present a potentially significant fire risk: if the panels are sufficiently heated, the polyurethane present will lead to gas emission and flammable and toxic fumes will be released. These fumes include ammonia, hydrocyanic acid, and nitrous fumes.

The Committee of Enquiry concluded "that during the first minutes the polyurethane from the

roof construction was the main fuel for the fire." If the firefighters had been aware that these flammable sandwich panels were used in the building they could have adopted a defensive strategy attacking the fire from the outside, rather than entering the building, facing toxic plumes of acid smoke that reduced visibility to almost zero. Plastic foam insulation is used extensively in the construction of both domestic and commercial construction in the UK. Given the De Punt situation it graphically illustrates the importance of understanding the materials that have been used in building construction.

Concerns have also been expressed whether the correct tests are being employed to confirm if materials are safe for use in construction. All the component construction materials within a building may pass the relevant safety checks; however, these are often conducted in isolation from surrounding materials and conducted in laboratory conditions. Sandwich panels, structural insulated panels and other modern building materials and techniques are now part of the 'complex system' in today's buildings. Although tested, like all materials, their behaviour in fire 'in situ' may vary considerably. Referring back to building regulation 16B, the design, build, maintenance and use of the building all need to be 'Just So'. In a 'real' environment materials may behave in any very different way, when exposed to extreme temperatures. Fire fighters rely on regulators to ensure that buildings are constructed to the highest possible safety standards, comprising of materials that will offer a high likelihood of a known degree of passive fire resistance.

Fire & Rescue Services can, and do capture risk information. They integrate risk information from various sources (operational crews, fire safety inspections, etc.) and undertake risk visits and exercises at known high-risk premises. However, there are not the resources to visit or keep complete information on all premises.

It is unrealistic to expect perfect information regarding every property, particularly when there are so many legacy issues to address. We have buildings that have been standing over a hundred years that have never been refurbished – or at least never applied to Building Control, so there will inevitably be gaps in knowledge. However, moving forward we can look to set new benchmarks, particularly with regard to the transparency and accessibility of the materials used to construct our buildings and their chemical properties.

I contend that a central repository should be created, be it with Council Building Control departments or elsewhere, to accurately record all materials that have been used in the composition of a building that could prove unduly hazardous for fire fighters entering a building.

- We would like to know what materials are in the building.
- We would like to rely upon them having been chosen correctly and fitted and maintained properly.
- We would like to have access to critical information, location of gas mains, ventilation switches, flammable stores, etc.

Given reliable information we will be more able to make decisions that best protect the lives of both the public and firefighters.

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Oil & Gas, and the need for a clean, fast-acting solution

By Alan Elder

EMEA Sales Director,
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Touch on the subject of petrochemical fires and attention invariably turns immediately to storage tank, exploration platform or pipeline fires and explosions. However, control and command centres, from where every aspect of the operation is masterminded, are potentially an equally serious fire risk that calls for swift and reliable protection, as Alan Elder explains.

Whether on-shore or off-shore, control room fires often have their origin in an event as simple as a short circuit in a piece of computer, telecommunications or machinery control equipment, or the overheating of electric cables. Far less frequently, it appears, are they brought about – unless indirectly – by the flammable liquid or explosive gas leaks that seem to trigger the majority of the headline-grabbing petrochemical blazes.

Nevertheless, these fires are no less threatening, and these environments must be given protection that will bring the fire under control in the shortest possible time, minimise damage to facilities that may well be essential to the continued operation of the facility, safeguard the lives of those working in the room, and stop the fire spreading and

possibly escalating a minor outbreak into a catastrophic inferno. A thorough risk assessment is therefore not only a mandatory requirement in most parts of the world, it is also the only way in which an effectively engineered solution can be arrived at.

Until its demise in the early 1990s, Halon 1301 had been the gaseous fire suppression agent of choice for control rooms and the like for more than 30 years. Providing the installation designer ensured that certain concentration limits were not exceeded and that occupants could evacuate the room or enclosure within a specified time, Halon 1301 was acceptable for occupied environments. The same acceptability claim did not though apply to the environmentalists and legislation makers, who rang Halon's death knoll as a fire suppressant with the signing of the Montreal Protocol on



The environmentalist' agent of choice

In the end, it took a new technology to finally resolve the Halon replacement challenge and provide the market with a clean, environmentally-sensitive agent. Scientists at 3M™ developed what came to be known as Novec™ 1230 fluid. Technically a fluorinated ketone or fluoroketone, it is a low toxicity, low vapour pressure fluid with a boiling point of 49°C that exists as a liquid at room temperature. When discharged, it converts into a colourless and essentially odourless gas that rapidly extinguishes, primarily through heat absorption, to the point where combustion ceases.

Tyco Fire Suppression & Building Products harnessed this unique technology and, in 2004, launched SAPPHIRE®. Since then, it has been adopted across the world as the total-flooding, fixed fire suppression system of choice for many off-shore and on-shore oil and gas applications and has amassed a host of international approvals. Today, these include LPCB (Loss Prevention Certification Board), FM (Factory Mutual) and UL (Underwriters Laboratories) listings, along with an impressive number of marine approvals, such as LRS (Lloyds Register of Shipping), DNV (Det Norske Veritas), ABS (American Bureau of Shipping), BV (Bureau Veritas), and RINA (Registro Italiano Navale).

SAPPHIRE has a negligible impact on the environment, no measurable effect on climate change and an insignificant global warming potential that is substantially lower than any of the halocarbon agents that are acceptable for use in occupied spaces. Compared with Halon 1301's Ozone depletion potential of 12.0, SAPPHIRE's is zero; its global warming potential is 1 against Halon's 6900; and the agent's atmospheric lifetime is between three and five days, contrasting with Halon's 65 years.

It contains neither bromine nor chlorine and, significantly, SAPPHIRE is not included in the basket of "greenhouse gases" identified by the Kyoto Protocol to the United Nations Framework Convention on Climate Change. It is, however, listed as "acceptable without restrictions" in the USA's EPA (Environmental Protection Agency) Significant New Alternatives Policy (SNAP) program that evaluates and regulates substitutes for the ozone-depleting chemicals that are being phased out under the stratospheric ozone protection provisions of the EPA's Clean Air Act.

Toxicity testing has shown that the Novec 1230 fluid is safe for use in occupied areas; studies have conclusively demonstrated that the agent is very low in both acute and chronic toxicity. While certain halocarbons and inert gases are used at design concentrations that are below the NOAEL or No Observed Adverse Effect Level, SAPPHIRE has the lowest design concentration of any viable Halon

Substances that Deplete the Ozone Layer. The main problem was that, while it was an excellent fire suppression agent, Halon 1301 had an unacceptable profile.

The signing of the Protocol was followed by a flurry of activity that resulted on a number of Halon replacements coming onto the market, as environmental considerations and the agent's clean credentials moved higher up the agenda when selecting a fire suppression system. Indeed, these considerations now often rank with equal importance to the speed and efficiency with which the agent extinguishes a fire.

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1301 chemical alternative and offers a huge safety margin, confirming its status as one of the safest alternatives to Halon 1301.

Petrochemicals industry appeal

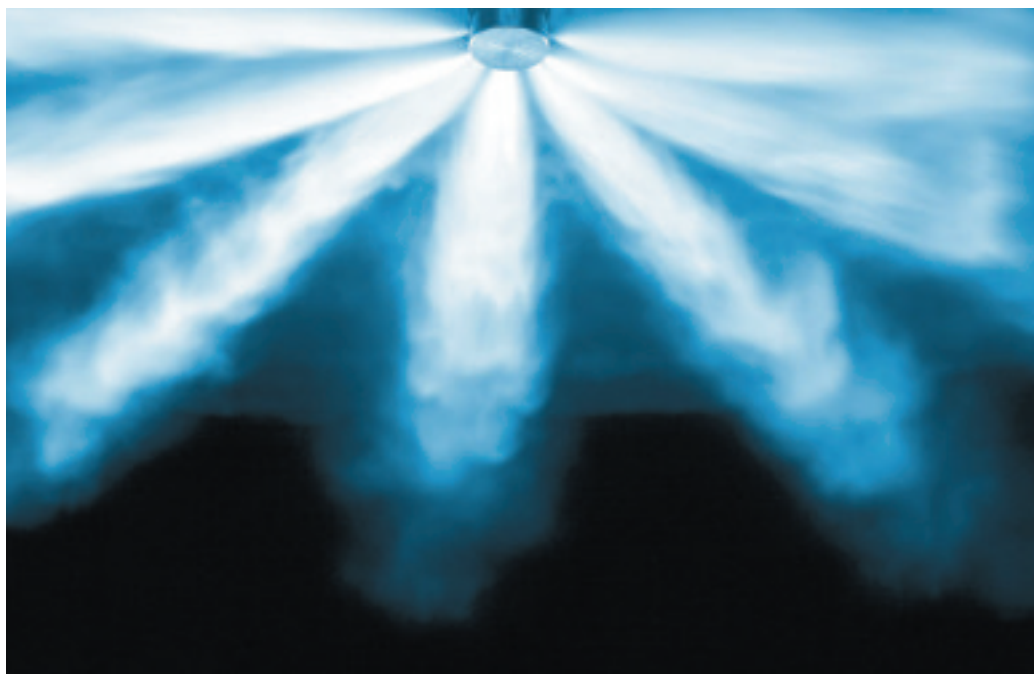
The SAPHIRE system comprises: the extinguishing agent that is stored in steel containers; various types of pneumatic and electric actuators; and a network of pipes and nozzles to release the agent into the hazard area. The nozzles have a fixed number of orifices and are designed to deliver a uniform discharge throughout the protected area. The system complies with BS EN 15004 (*Fixed firefighting systems. Gas extinguishing systems*), NFPA 2001 (*Standard on Clean Agent Fire Extinguishing Systems*), and ISO 14520 (*Gaseous fire-extinguishing systems. Physical properties and system design*).

SAPHIRE has several major advantages over other extinguishants currently on the market. The petrochemicals industry was obliged to go to considerable expense to decommission Halon installations following the Montreal Protocol, so SAPHIRE's sustainable, long-term technology underpinned its performance credentials. It not only meets today's legislative requirements, it also meets all of those in the foreseeable future. So much so that it is backed by a global 20 year replacement warranty against its banning or restriction on environmental grounds by government or regulatory bodies.

Downtime costs in the petrochemicals industry are well documented, so the SAPHIRE's system's extinguishant delivery time of ten seconds or less, added to its appeal for protecting mission-critical environments. With such rapid deployment, SAPHIRE stops Class A, Class B and Class C fires before they have a chance to spread, resulting in less damage, lower repair costs and reduced downtime. It is non-conductive and non-corrosive, and leaves no residue to damage sensitive equipment, so SAPHIRE can be used with complete confidence to suppress fires involving vital electronic equipment.



In terms of storage requirement, SAPHIRE installations have an installed footprint similar to that of other chemically-based clean agent systems. Thanks to the agent's high boiling point and low vapour pressure it can be transported in lightweight totes or drums, as opposed to steel pressurised containers, allowing it to be readily air freighted. **IFF**



Alan Elder is EMEA Sales Director for commercial suppression businesses for Tyco Fire Suppression & Building Products. More information is available by telephone on +44 (0) 161 875 0402, by fax on +44 (0) 161 875 0493, or via email at marketing@tyco-bspd.com. Further information can also be found at www.hygood.co.uk



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Aircraft rescue and firefighting requires the best foam available: AFFF

I was looking over the abstracts for an upcoming foam seminar at which I will be speaking and noticed a presentation by the Chief Fire Officer at a small international airport. According to the abstract the airport fire department has switched to using a less effective “fluorine-free” foam in order to appease the local environment agency. All I could think of after reading the abstract was that I am glad I don’t have to fly into that airport!

By Tom Cortina

**Fire Fighting Foams
Coalition**

All joking aside, it is surprising and disappointing to see an environmental authority convince a fire department to use a less effective foam for a critical life safety application such as crash rescue firefighting over concern for the potential for a small amount of persistent but low-toxicity chemicals to be released to the environment. Although runway crashes of aircraft do happen at airports around the world each year, they are an infrequent occurrence at any particular airport, and so the risk of extensive groundwater contamination at any individual site from foam discharge will be very small. At the same time the risk from fire to passengers and ground personnel when such a crash

does occur is very real, and in that situation you would hope that the airport is using the most effective product available to extinguish the fire.

Fluorosurfactants are a key ingredient

Fluorosurfactant-containing foams, in particular aqueous film-forming foams (AFFF), are the most effective agents currently available to fight Class B flammable liquid fires at airports and in military, industrial, and municipal settings. This fact has been consistently proven in fire tests done over the last 30 years and in tests that are being performed today. This exceptional fire-fighting effectiveness of AFFF is due to the formation and spreading of an aqueous

film formed on top of lighter hydrocarbon fuels. Only fluorosurfactants can provide AFFF with the required low surface tension and positive spreading coefficient that enable film formation. It is this film formation capability that gives AFFF its name and its effectiveness against flammable liquid fires. AFFF agents provide rapid extinguishment, burnback resistance, and protection against vapor release.

3M used a process called electrochemical fluorination to manufacture the fluorinated components of the fluorosurfactants contained in its AFFF formulations. Fluorosurfactants produced by this process both contain and degrade into chemicals known as PFOS (perfluorooctyl sulfonate) and PFOA (perfluorooctanoic acid). Other competitive manufacturers use a process called telomerization to produce the chemical components of the fluorosurfactants contained in AFFF agents. Chemicals produced by this process are generally referred to as telomers or fluorotelomers. With the withdrawal of the PFOS-based products due to their persistence, bioaccumulative and toxic properties (beginning in May 2000) and their subsequent regulation by various national governments, there has been a substantial shift from PFOS-based AFFF agents to equally effective AFFF agents containing telomer-based fluorosurfactants.

Fluorine-free foams

As a result of the concerns raised by the PFOS issue, foam manufacturers continue to evaluate many types of potential products that do not contain fluorosurfactants. Efforts to date have not yielded working products with fire performance across all fuels and in all operational circumstances equal to film-forming foams. Some fluorine-free foam can provide an alternative to AFFF in some applications, but they are not currently able to provide the same level of fire suppression capability, flexibility, and scope of usage. A recent paper from the University of Newcastle that shows that even the best available fluorine-free foams would need to be replenished three times as often as AFFF to provide the same level of fire protection.¹

Fluorine-free foams are often championed as “environmentally-friendly” alternatives to AFFF. Although such foams may not contain fluorine, their environmental profile related to biodegradation, acute toxicity, chemical oxygen demand (COD), and biochemical oxygen demand (BOD) is typically no better than fluorine-containing products and in many cases is not as environmentally responsible in use as AFFF. A recent study of commercially available fire fighting foam agents indicates that fluorine-free foams are at least an order of magnitude higher in aquatic toxicity than AFFF agents.²

An important consideration in assessing the risk of any foam will be its effectiveness in extinguishing the fire and preventing re-ignition. A fluorine-free foam may appear to present less risk to the environment because it does not contain persistent chemicals. But if it takes significantly longer and requires more foam to extinguish the fire, then it may actually present a greater risk, including the potential for loss of life and/or high value property.

Firefighter safety

All of the currently available fluorine-free foams rely upon having a good enough foam blanket in terms of expansion ratio and drainage rate to overcome the inherent problem of fuel contamination of the foam blanket. This requires the use of air aspirating branch pipes or nozzles in order to achieve the necessary level of foam quality, which is a step backwards for firefighter safety.

The use of non-aspirating discharge devices, such as variable pattern water fog nozzles, provides two very important safety factors for firefighters. First, since none of the available energy of the system needs to be utilized by an air aspirating venturi at the discharge device, the range from that device will be maximized. Distance from the fire is always a key to firefighter safety. Second, when using a variable pattern water fog nozzle, the firefighter has the ability to change his stream pattern to a full fog for personnel protection against a thermal event (“left for life – right for fight”).

The use of non-aspirated film-forming foam provides an added benefit in terms of speed of knock down and control of the fire as well as the ability to quickly cover the areas where the foam blanket has been disrupted. Again, these two factors improve firefighter safety and when used in operations such as crash fire rescue, are absolutely essential in terms of overall safety and success. These are some of the factors that led the Federal Aviation Administration in 2006 to require US airports to be equipped with AFFF that meets the US military specification (Mil-F-24385F), one of the most respected foam standards in the world.

Environmental update

In my last article that was co-authored by Dr. Stephen Korzeniowski of DuPont (June 2008 issue) we reviewed all of the latest science related to the environmental effects of fluorosurfactants. Since that article there has been a new study published by SFT related to fluorochemicals found at fire training facilities in Norway. Although the study does not contain any new conclusions, it has drawn interest within the foam industry.

The SFT study confirms the findings of previous studies that the likely ultimate biodegradation products of the fluorosurfactants used in currently manufactured AFFF agents are persistent, but are not considered to be significant environmental toxins. The low bioaccumulation values developed in this study reinforce previous assertions of the general safety of these products. Because these studies were done at fire training areas where foams were released uncontrolled numerous times over many years, the findings should not be used to assess the impact of a one-time use of a fire-fighting foam to extinguish a fire, which would result in significantly smaller contaminant concentrations. Current accepted practice is to use fluorine-free training foams whenever possible as well as to collect and treat foam discharges when fluorine-containing foams are used for training or testing.

The three main fluorochemicals found in the SFT study – PFOS, PFOA, and 6:2 FTS (6:2 fluorotelomer sulfonate) – have been found previously in ground-water studies from fire training facilities in the United States.³ PFOS and PFOA were likely contaminants and/or biodegradation products of the ECF-based fluorosurfactants contained in AFFF agents primarily manufactured by 3M prior to 2002. 6:2 FTS is a likely biodegradation product of the telomer-based surfactants contained in currently manufactured AFFF agents (manufactured since the 1970s). Neither of these compounds (PFOS or 6:2 FTS) was used directly ‘as is’ in the AFFF agents, as was cited incorrectly in the SFT study. As noted above they are contaminants and/or biodegradation products of the more complex fluorosurfactants that are the key functional ingredients in AFFF.

The SFT study does confirm previously reported data that 6:2 FTS is neither bioaccumulative nor biopersistent. The bioaccumulation factor (BAF) values for 6:2 FTS in earthworms from the SFT

New ARFF-Fleet at Hamburg International Airport: ZIEGLER Z 8



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report and in rainbow trout from previous studies⁴ are 100-1000 times lower than EU regulatory criteria for bioaccumulation.

The BAF values were slightly higher for 6:2 FTS than for PFOS and PFOA in the SFT study. For this reason we would expect advocates of alternative foams to argue that 6:2 FTS has similar environmental properties to PFOS and therefore the use of telomer-based foams should be limited. We would argue that the SFT study results do not change the basic conclusion from a broad range of existing data that 6:2 FTS is not similar to PFOS in either its physical or ecotoxicological properties.^{5,6,7,8} Recent studies on AFFF telomer-based fluorosurfactants likely to break down to 6:2 FTS show it to be generally low in acute, sub-chronic, and aquatic toxicity, and neither a genetic nor developmental toxicant. Both the AFFF surfactant and 6:2 FTS were significantly lower than PFOS when tested in biopersistence screening studies that provide a relative measure of biouptake and clearance.⁹

PFOA is not likely to have come from fluorotelomer-based AFFF in any significant amounts. The fluorotelomer-based surfactants used in AFFF agents are not made with PFOA and PFOA is not used in the manufacturing process. Current unintended trace quantities of PFOA in fluorotelomer-based AFFF will be virtually eliminated under the US Environmental Protection Agency (EPA) PFOA global stewardship program. Under the program telomer producers have committed to 95% reductions of PFOA, PFOA precursors, and related higher homologue chemicals by year-end 2010 and are working toward the elimination of these chemicals from both plant emissions and finished products by year-end 2015.

Members of the Fire Fighting Foam Coalition that make telomer-based fluorosurfactants and AFFF agents are in position to meet the goals of the global stewardship program before the 2015 target date with a family of all C6-based fluorosurfactants that provide the same fire protection characteristics with reduced environmental impacts. Incorporating these new fluorosurfactants will require some reformulation and likely some type of re-approval of most current AFFF, FFFP, and fluoroprotein foam products between 2010 and 2015.

PFOS is not completely gone

Although the manufacture and import of PFOS-based foams is banned in the United States, Canada, and the European Union, it is our understanding that these foams are still being manufactured in China. One of the reasons for this continued production may be a misconception that PFOS-based AFFF agents are more effective than telomer-based

AFFF agents. This is simply not true. AFFF agents are equally effective whether they contain PFOS-based fluorosurfactants or telomer-based fluorosurfactants. The PFOS-based AFFF agents previously sold by 3M, and the telomer-based AFFF agents currently sold by companies such as Kidde, Ansul, and Chemguard, all meet the same material specifications of the International Standards Organization (ISO Standard 7203), Underwriters Laboratories (UL Standard 162), and the US military (Mil-F-24385). PFOS-based and telomer-based foam concentrates are used interchangeably in the same equipment and at the same concentration levels by military and industrial users around the world. Considering the significant differences in toxicity and environmental effects between PFOS and telomer-based foam agents, it seems logical for China to make the switch as most of the rest of the world has done.

IFF

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SCDF DART personnel evacuating a casualty during Ops Lionheart Sichuan, China. Picture courtesy of SCDF



Staying Safe at Structural Collapse Operations

By Michael Lee

Structural collapse operations are a high risk/low frequency event that can kill firefighters when not practiced properly. The ability to deliver collapse operations can be broken down into five phases: arrival, surface rescue ops, interior rescue ops, selected debris removal and general debris removal.

Arrival phase

In the arrival phase, units are dispatched to a structure after a partial or complete structural collapse has occurred. Initial units should complete an immediate size-up and establish command. A command post should be established from the onset as this can be a prolonged event. Arriving apparatus should be staged away from a possible secondary collapse zone and considerations for blocking off surrounding traffic should be considered to reduce vibrations and interference with incoming resources. Command should con-

sider instituting Level 2 staging procedures immediately, while the management of emergency and civilian traffic is critical.

You should assess for and order resources early. If it is later determined that the additional resources are not needed, command can return these units to service. In addition, assess the need for outside heavy equipment early and request mobile cranes, front-end loaders, etc., with large capacities. In addition, consider early activation of local USAR resources if required.

Command should do an immediate hazard

A firefighter at the scene of a collapsed building in downtown Clinton, Mo., where several people were rescued in June last year



assessment – and then confirm it by appointing a Safety Officer to perform another size-up. Among the hazards associated with structural collapse are the potential for secondary collapse, explosion with fire due to broken gas and electrical lines, falling debris and a toxic atmosphere.

These hazards mean that safety and utility groups should secure hazards as soon as possible, including shutting off gas, electricity and water. If it is not possible to secure all hazards, Command should notify all rescue personnel operating on scene of the hazards present. Unless strong control of the incident is gained quickly, things can easily escalate out-of-control.

Surface rescue operations

Initial on-scene units should be directed in rescuing victims that can be seen on the surface and it's vital that rescuers are aware of all the physical hazards present at the scene of a structural collapse.

While the initial rescue of surface victims is going on, Command should establish a perimeter around the whole site and keep all incoming civilian personnel out of the immediate area. Those civilians already operating on site – and believe me, they will be there – prior to your units arriving should be assessed for effectiveness. If they can be used safely, try and outfit them with safety gear – helmets, gloves and goggles. If it appears they are ineffective or too emotional, remove them from the area for the safety of everyone.

After initial surface victim removal has been completed, Command should ensure that all personnel are removed from the collapse site. This will allow for the removal of all civilians and the regrouping of rescue personnel so that a specific action plan can be instituted for the search and rescue of remaining trapped victims.

It's at this time that Command should order a situation report from area officers. Members previously operating in the collapse structure should be quickly debriefed as to building lay out and possible location of victims. After all personnel have been removed from the collapse site, Command should establish structure triage teams. These may include structural engineers and/or personnel that are specifically trained in the recognition of structural collapse.

Before these teams begin triage activity, Command should notify them as to the specific action plan and building marking system (FEMA marking system). If there is a possibility of hazardous materials involvement, Command should assign a Haz Mat Technician to each building triage team.

During the initial stages of a campaign operation, Command should attempt to ensure that there will be roadways into and out of the collapse site. This may include establishing liaison with the police department and having it reroute all traffic well around the collapse site. Also, victim staging areas should be established by creating a Medical Group or Branch based on the anticipated number of resources anticipated for establishment of triage, treatment and transportation needs. An area should be established away from the hazards of the collapse to account for, treat and transport victims.

Interior rescue operations phase

First, only those personnel qualified to perform structural collapse stabilization and void access with shoring should be assigned to interior search/rescue teams. A specific action plan should be made for the search and rescue of the remaining victims, with this plan being distributed to all



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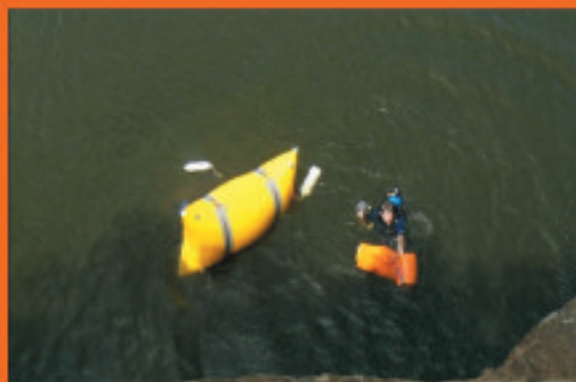
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rescue personnel operating at the collapse site.

Prior to beginning search and rescue operations, Command should create specific search teams. These may include personnel with technical search equipment (i.e. acoustic, fiber optic, video, etc.), dog teams or personnel using the hailing (call-out) method of searching for victims.

After the building triage teams have completed evaluations of buildings, the search teams can then enter them. These teams should use standard building marking system (FEMA marking system) after the structure has been searched. If building triage teams determine that the building is structurally unstable, the search and rescue team should not enter until appropriate shoring and stabilization has been accomplished.

In a building that has been determined to be unsafe by the building triage teams, rescue teams should not attempt rescues. These teams should follow search teams that have searched previously triaged buildings and should consist of at least two trained team members. They should also have access to at least one HazMat Tech with air monitoring equipment. If at all possible, rescue teams should attempt to gain access vertically; the horizontal breaching of walls should be done only if there is no other means to reach the void space

If a victim is located, the rescue team should treat the area that they've been found in as a confined space and follow confined space rescue operations guidelines.

that victims may be trapped in. Horizontal breaching of a load-bearing wall may precipitate a secondary collapse of the structure but the potential for secondary collapse can be reduced if the rescue team breaches structural members from above or below. Prior to breaching a structural load-bearing member, a specially trained structural collapse specialist should approve and oversee this operation. If the atmospheric conditions are not known in the room of desired entry, a pilot hole should be punched to monitor it prior to the beginning of breaching operations.

If a victim is located, the rescue team should treat the area that they've been found in as a confined space and follow confined space rescue operations guidelines. The rescue team leader should designate the proper method of entry into the space and ensure the safety of the entry rescuer. All spaces must be monitored for flammable, toxic and oxygen deficient atmospheres before entry is made.

Once the rescue team has made contact with the victim(s), an immediate assessment of the victim(s) needs to be carried out. One thing to remember is the effects that lifting objects off the victim can have on them (Compartment Syndrome). The safest and most effective method of victim extrication needs to be determined, with the rescue team leader ensuring the safety of the extrication process. Once the victim(s) have been removed to a safe location, they should be

transferred to the Treatment Sector for continued ALS care.

After all located victims have been removed from the building, the rescue teams should pull out of the building and update the marking system. Rescue teams should keep in mind that any cribbing and shoring should be left in place as the removal of these systems could precipitate a secondary collapse.

Selected debris removal phase

If rescue teams have not been able to find victims through other methods, then they should try to be located by removing debris. If there is a potential for live victims, teams must be very careful when removing debris so as not to cause a secondary collapse or further injury to the victim(s).

If a victim location is known, either from family members or previously rescued people, an attempt should be made to remove debris to reach that person. In lightweight frame construction buildings, this can be accomplished by cutting and hand-removing structural members. This may also require the use of a crane to pick and move the structural components to reach potential victims. Rescue team members should assist in the break-up and removal of structural components.

During all of these operations, a safety officer should be overseeing things to ensure site safety for all operating personnel. If structural components are removed from the site, they should be marked in some way so they can be identified – which building they came from, etc., – for future investigative/forensic purposes.

As debris is removed, all operations should be stopped periodically to search (acoustic, dog team, hailing) for victims. After enough debris has been removed to reasonably ascertain that there are not any victims, search and rescue operations can then be suspended in that building.

General debris removal phase

Prior to beginning general debris removal, Command should call for a situation report to establish victim survivability – remember life is lived by the rule of 3's; 3 minutes without air, 3 days without water and 3 weeks without food. If it has been determined that no victims can be found alive in the building, a general debris removal can begin. Should there be a potential for deceased victims to be trapped in the rubble, removal crews should be alert for signs of them.

During general debris removal, if heavy equipment operators spot a sign of a deceased victim(s), a selected debris removal can be conducted in order to remove them respectfully. The coroner and/or other investigative personnel should then be notified to authorize the removal of the body(ies). As debris is removed, each dump truck load should also be marked as to the general area found and final location of the debris, which will help investigators complete their forensic analysis.

Prior to termination of the incident, Command need to account for all personnel that have been operating at the collapse site. Each sector officer should ensure crew and equipment accountability before returning to service. And if Command has not previously addressed the issue of C.I.S.D., he/she may consider doing so during the termination phase. After the personnel and equipment are back in service, debriefing can be carried out. **IFF**

Michael Lee has 25 years experience in pre-hospital paramedic experience and about 20 years experience in the fire service. He started as a FF/Paramedic and worked up through the ranks, including training officer, to his current position as battalion chief at Cunningham Fire Dept in Colorado. He is currently filling the role of safety officer for FEMA USAR Colorado Task Force One and has military service in the U.S. Navy. To contact Michael, email Michael.Lee@FireRescue1.com

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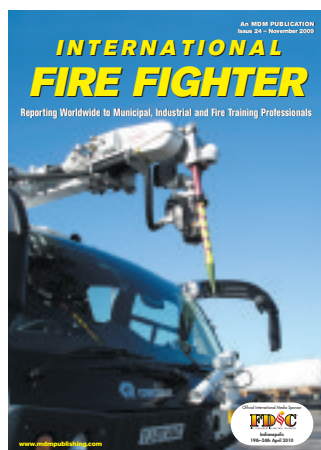
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Front Cover Picture: Crash Rescue's Snuzzle fitted to a Rosenbauer Panther at Newcastle Airport. Pic courtesy Mark Bathard

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Vacuum chambers for safe access

Recovery teams are confronted with extremely difficult and varying situations when carrying out aircraft recovery. With the newly developed Vacuum Contour Chambers they literally get a better hold on the situation at the operation site.

For their size, aircraft have a lightweight construction. Naturally, this is of advantage for flight characteristics but for recovery this is more difficult. In addition to this fact, the shapes of wings and fuselages are as numerous as the many types of aircraft. When carrying out recovery operations with conventional aircraft lifting bags – without individual contour matching – it is often not possible to optimally position the aircraft lifting bags. The consequence: the object being recovered can easily slip.



Flexible and stable in every operational situation

VETTER, the pneumatic specialist, determined the weak points in the rescue process and now offer an innovative solution: Vacuum Contour Chambers which individually match to the shape of the aircraft. During operation these are

firstly filled with polystyrene pellets and lastly vacuumed. The shape match is so exact that even areas of unevenness are reproduced in shape, e.g. rows of rivets.

Everything is solid but gently under control

Applicable for all types of aircraft, the stable chambers meet the highest safety specifications. Applied any amount of times, they enable guaranteed straight lifting with the minimum of pressure point loading on the sensitive aircraft body.

From innovation to standard

Since its new development in 2007, the system has become indispensable as an aid in the field of aircraft recovery. Also because it is able to be combined with normal pneumatic aircraft lifting bags. At the "Inter Airport" Munich, the International Trade Fair for Aircraft Equipment, Vetter will be presenting its fully developed product series for Vacuum Contour Chambers between 6th – 9th October.

For more information:

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Newcastle International Airport Foam Trials

By kind invitation from the airport

fire chief at NEWCASTLE INTERNATIONAL AIRPORT, IFF Magazine attended in October, a morning of demonstrations involving the testing of a new foam.

The airport fire department deployed two of their three Rosenbauer Panther ARFF vehicles which were delivered to Newcastle only two years ago by Angloco to assist in the foam trials. The Rosenbauer Panther is an awesome vehicle. It boasts a power output of 705hp at 2300rpm and can reach 80kmh in less than 34 seconds. Its pumping system can deliver an incredible 7000lpm at 10bar while its foam proportioning system delivers foam at either 3%, 6% and 8%.

Newcastle Airport Rosenbauer Panther

Fitted to the Panthers are Crash Rescue Equipment's "Snuzzle". These are the model 501 with piercing nozzles which have a 36" (914mm) piercing depth with proportional speed control. The nozzle joystick contains all fire fighting features. High flow and low flow water/foam discharge, dry chemical discharge, pierce/volume



nozzle selection and fog/stream control. The boom joystick also has "dead man" buttons to prevent unintended boom movement. The volume nozzle can flow at 1000gpm (3785lpm) at full elevation and the piercing nozzle can flow at up to 375gpm (1420lpm).

Snuzzle during foam tests

One of the tests on the foam was to see how it retained its blanketing qualities and after two or three tests, the consensus was that this was more than successful retaining its blanketing far longer than other foams at the same mixture.

As mentioned above, further tests will be carried out later this year where a full report will be published in the February issue.

For more information about the Snuzzle please contact:

Crash Rescue Equipment Inc
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www.crashrescue.com

For more information about Angloco:
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QUIC-LIFT Ladder Access Systems

Ziamatic Corp's QUIC-LIFT Ladder Access Systems are available for raising and lowering aluminum ladders and hard sleeves commonly carried on fire apparatus. It uses two units that are mounted on the side of the apparatus's body. The ladders and hard sleeves are kept close to the vehicle when lowered allowing for apparatus to be positioned into tight situations.



There are three different units. Model LAS will mount on either a horizontal or vertical surface, the LAS-BHM mounts on vertical surfaces only. It is commonly used when a shelf is not available for the unit to rest on. And the third unit is the HSS, which is for mounting hard sleeves. The systems are constructed of high-strength aluminum castings and are controlled by a double-throw momentary switch. At the flick of the switch, the system lowers the ladders to a comfortable level for retrieval, reducing the chances of back injuries and allowing for more accessible storage space. The units can be easily retro-fitted onto existing pumpers or tankers and only requires 12 VDC. A flashing light kit is provided to produce a visual signal when the ladder access system is out of the stored position. Mounting brackets may be attached to castings for storage of folding ladders and pike poles. The total height, above the mounting shelf, is 33" for ladders and 30" for hard sleeves. The unit lowers ladders and hard sleeves 31" from the stored position. The unit is powered by either two durable high cycle electric actuators or self contained hydraulic actuators, both of which have been tested to over 5,000 operating cycles. The systems are rated up to a maximum load of 300 lbs and can have a manual or electric locking system added on for additional security.

Zico's Horizontal Ladder Access Systems, model HLAS, is designed to store fire department ground ladders horizontally over side compartments on fire apparatus. The basic unit is mounted in the center of the compartments and a door is typically put in front to cover the basic unit from view (Door is not provided). The base casting may be bolted to the top of the side compartment and/or to the hose bed as well. By using a center mount-

ing unit, less compartment space is lost helping to create maximum storage without compromising on safety. The electro-hydraulic system with a built-in electric safety latch only requires 14"W x 12"D x 56"H for mounting. The Electrical system has a 60-amp draw and requires an 80-amp fuse. Both the control and electrical panels are provided with the unit. Each HLAS system comes complete with a flashing light kit to indicate when the system is out of the store position. Like the LAS, the Horizontal Ladder Access Systems is also constructed of high-strength aluminum castings and has a maximum lifting capacity of 300 lbs. A variety of optional equipment is available for the HLAS. Some of the options are pike pole mounts, folding ladder mounts and hard sleeve mounts for the top of the unit. An audio/visual alarm system can also be added to provide an audio indication, as well as visual, when the system is out of the stored position. The HLAS is also available to carry strictly hard sleeves or a portable tank. All available combinations can be found on our website at www.ziamatic.com

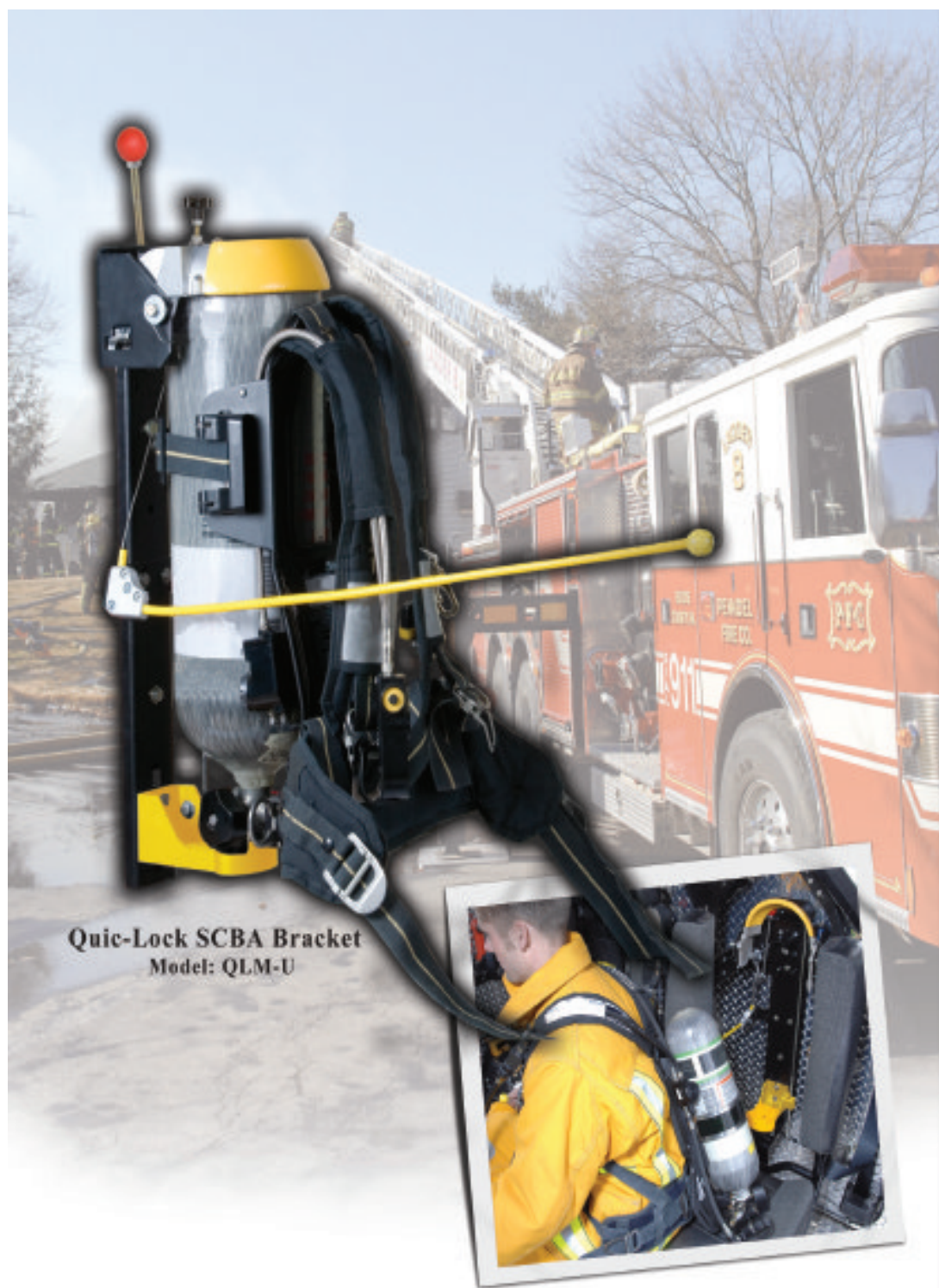
Both the standard Ladder Access Systems and the Horizontal Ladder Access Systems are built with the highest of standards of quality and have been on the market and field tested for over 12 years.

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For more information, please contact:

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Quic-Lock SCBA Bracket
Model: QLM-U

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DuPont Kevlar collaborates with state of the art glove designer Seiz GmbH

A glove for heroes – The new THW glove from SEIZ

60,000 members of THW Technisches Hilfswerk (German Urban Search and Rescue Association) are better protected thanks to the new safety glove manufactured by Seiz.

Having contributed aid at some of the world's most notable disasters, members of THW know the importance of having the correct protective clothing when volunteering in a disaster. Rescue workers from the voluntary organisation have been faced with many hostile environments including the 2004 Boxing Day Tsunami and Hurricane Katrina in 2005.

It is these environments that make it necessary for the rescue workers to be fitted with the correct personal protective apparel, including gloves. THW put out a Europe wide tender to supply its 60,000 members with a multi-functional protective glove. The glove needed to offer protection against all eventualities as rescuers handle different materials or substances and can be exposed to a vast array of situations from varying weather conditions to sharp, rough and hot surfaces, which unavoidably have to be dealt with in case of emergency.

Multi-functional protection

It was the multi-functionality of the glove by Seiz that satisfied the requirements of THW to withstand all hazards the rescue workers could potentially be exposed to. Speaking about the new tender, Rainer Seiz, owner and head designer of Friedrich Seiz GmbH said: "From the very start of our conceptual work it had been clear that only high end performing material combined with up to date sandwich design technology would enable us to meet all the properties described in the tender". Germany based company, Seiz, is renowned for producing tailor made hand protection solutions for fire fighters, police and diverse industries.

The glove incorporates DuPont™ Kevlar® and

Nomex® fibres that increase its multi-functional properties. Due to the inner lining of DuPont™ Kevlar®, a high level of cut resistance is achieved. The back of the glove is made from a flame resistant fabric that combines DuPont™ Nomex® with an applied felt made from Kevlar® that increases the safety against contact heat, perforation and cuts. On top of this, the glove provides good abrasion properties and water repellence.

Low weight, high dexterity

As well as its multi-functional protective properties the Seiz-THW glove presents itself as a low weight champion at only 5 ounces (150 grams) with high dexterity qualities that enable a tight grip on tools, such as hammers, screw drivers and wrenches, as well as easy handling of technical equipment like plugs and computers. The light weight glove provides maximum comfort for the rescue workers whilst still offering this highest level of protection in many environments.

DuPont™ Kevlar® – the key to success

Whenever outstanding cut and stitch resistance is required the DuPont™ Kevlar® brand fibre is the key to success. Extremely tear resistant Kevlar® offers a manifold of strength as well as maintaining its mechanical performance up to temperatures as high as 320°C.

The overall versatility of this high-tech all-rounder has raised the bar of hand protection and comfort to a new height. Rainer-Seiz hints: "The unique combination of dexterity and temperature isolation of the Seiz-THW glove might even stir skiers' blood".

IFF

For more information on DuPont™ KEVLAR® please visit www.dpp-europe.com

For more information on Seiz Gloves contact:
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Rescue Air Cushions are available in 4 sizes and 2 pressure ranges for maximum versatility and a wide range of applications.

Typical Applications include:

- Major vehicle accidents (cars, trucks, buses)
- Light aircraft recovery
- Filling voids created in trench collapse
- Small vehicle turnovers
- Downed or trapped animals
- Rotation device
- Industrial lifting applications

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Sustainability – being a responsible company

Bronto Skylift celebrates the 10th anniversary of ISO 14001 Environment Management certification

BRONTO SKYLIFT, the world's leading manufacturer of big truck mounted hydraulic platforms, has always been a pioneer in product development, but it has also been in the forefront in advancing the ecological sustainability. Bronto Skylift obtained ISO 14001 environmental certification already in 1999, first in the field. Those days most competitors were still struggling to get their quality systems certified – which Bronto had done some years ago.

Nowadays, sustainability is much broader term which encompasses companies' responsibility for the impacts of their activities not only on environment, but also on employees, customers and communities. The total financial benefits of ethical and pro-environmental performance are sometimes difficult to quantify, but some clear and measurable changes in day-to-day operations can be shown. Bronto Skylift has succeeded in reducing the environmental impact of manufacturing through several actions: distillation of paint solvents, improved waste sorting and treatment of hazardous material, refusing the use of propellant-driven aerosol containers etc. By taking the above measures the VOC (volatile organic compound) emissions per manufactured machine have been reduced by over 10%. Waste sorting and recycling have been part of everyday life in Nordic countries for decades already, but Bronto Skylift has managed to reduce the amount of dumping ground waste of the total waste from 30 to 10 percent during the last 10 years.

The manufacturing, however, represents only about 10% of the environmental impacts of the Bronto Skylift platform during its entire life cycle. The high quality of our products means reliable performance for decades, longer service intervals and lower consumption of spare parts – all factors that reduce environmental impact of the product use. The company also facilitates pro-environmental features like the use of biodegradable hydraulic oil, separate power supply units, combustion engines and electric motors to reduce fuel consumption, exhaust gas emissions and noise.

During the 2000's a special emphasis

has been put on social aspects. The well-being of staff has an effect on productivity and makes it easier to recruit new employees. Bronto Skylift has had several "open doors" days for the employees'

families and local residents, presented the company in local school classes etc.

The aim of Bronto Skylift is doing financially, socially and ecologically sustainable business. The company has learned and showed that all three aspects can be combined.

For more information please contact:
Bronto Skylift
Tel: +358 20 7927 111
or visit us at our website at
www.bronto.fi

Akron Brass Heats Up with Special Rebates for Firefighters

AKRON BRASS is showing its appreciation to the men and women who risk their lives for their communities by offering special rebates on Akron Brass nozzles with the Firefighter Appreciation Rebate.

From now until December 31, 2009, a \$50 cash rebate will be given to firefighters who trade in any used Akron Brass nozzle and purchase one of three new Akron nozzles. For those firefighters who turn in another brand's nozzle and purchase a new Akron nozzle, a \$75 cash rebate will be provided.

The Firefighter Appreciation Rebate offers three, diverse Akron nozzles, so that every firefighter will find what they are looking for. The Turbojet®, Saberjet™ and Assault™ nozzles each offer unique qualities while delivering the exceptional durability and superior performance you have come to expect from Akron®.

The adjustable gallonage Turbojet® nozzle is known for its flexibility and flow control, making it one of the best nozzles in the world. The Assault™, with its superior stream performance and quick change pattern adjustment, is one of the most reliable and easy-to-use nozzles in today's fire service.

For a multipurpose nozzle, the Saberjet™ is the way to go. The Saberjet™ nozzle offers a Single Shutoff complete with a unique three position handle, and a Dual Shutoff, which allows both solid bore and fog stream to flow at the same time.

For more information on Akron Brass or the Firefighter Appreciation Rebate, visit www.akronbrass.com, call your local authorized Akron Brass Distributor or Akron's Customer Service Department at 1-800-228-1161.

Founded in 1918 and celebrating its 91st Anniversary, Akron Brass is a worldwide marketer and manufacturer of high performance fire fighting and emergency rescue equipment. A Premier Farnell company, Akron Brass is ISO 9001:2000 registered and has an excellent reputation for developing and manufacturing innovative products.

For more information, please contact:
Kim Morrow at 800-228-1161 or email at kmorrow@akronbrass.com





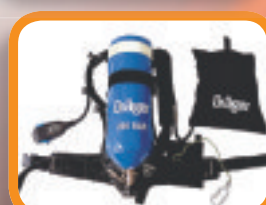
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Respiratory Protection Equipment at Frankfurt Airport Fire Service: a long partnership with MSA

Fraport fire service and MSA maintain a business relationship for many years. The brigade used to run BD96 breathing apparatus but over the last years, all devices have been updated to AirMaXX SL-Q. All of the roughly 250 units of this premium basic apparatus feature a length adjustable back plate and the unique SingleLine pneumatic system. Together with the curved harness, this highly ergonomic tool supports its user effectively.

The Quickfill connection serves to recharge the cylinder via a high pressure coupling while the cylinder remains on the apparatus or even on the user. This feature is essential in scenarios where extended operation time is needed for individual

persons. Fraport FS is prepared for quick refilling on the scene, e.g. in underground situations with considerably long access routes.

The positive pressure demand valve AutoMaXX-AE is appreciated particularly by the service personnel. As there is no need for regular service to the valve core, the maintenance effort is very limited.

When deciding for the AirMaXX breathing apparatus system, a thorough calculation with regard to total cost of ownership has been conducted. As a result of MSA's efforts to focus on longevity and modularity of components, as well as minimized amount of serviceable parts, MSA's offer has been regarded as leading technologically and commercially.



GB SOLO Welcome a new member to the team

GB SOLO, the UK's leader in thermal imaging cameras and fire fighting helmets, are once again pushing boundaries with the introduction of new products and advanced technologies that continue to bring them to the forefront of the industry. Their client base now spans the globe and they have achieved unprecedented growth throughout the last 18 months. This is testament to the team that Managing Director, Victoria McLaren, has brought together and this week she announced the introduction of a new addition to their team.

Mark Smith will join GB SOLO as Sales Manager and will work on key accounts throughout the UK and Europe. Mark joins the company having previously worked for Persides Ltd., catering for the defence and aerospace sector. He has worked with, and has contacts throughout, military and police forces. This is invaluable in the research and development of the GB SOLO range of products and it has also given Mark the experience and knowledge needed to offer the best possible service to many of their larger clients.

Mark is fully up to date with all the products and services GB SOLO offer and has worked previously with similar products. He is delighted to join a company like GB SOLO and said "GB SOLO have the reputation and vision to

become market leaders through their innovation and creativity. I am looking forward to working with such a creative team selling products that help save lives." GB SOLO welcome people to contact them and set up a demonstration with Mark. They also have a presence around the world through GB SOLO agents operating on various continents.

You can meet Mark at the DSEi in September or the Emergency Services Show 2009. Contact GB SOLO on +44 (0)1609 881855 for further details or to arrange a demonstration.

Everyone from Firefighters, Crash Teams and Marine Rescuers moving quickly to accident sites through to Security Personnel identifying intruders on even the darkest of nights have benefited from GB SOLO products.

Whatever the task, don't go it alone . . . go with SOLO.

For more information please visit www.gbsolo.co.uk



The equipment is tested fully automatically by ProfiCHECK test benches. To cope with the volume of face masks, one of the benches is a ProfiCHECK.twin, which features two test heads for uninterrupted mask testing.

Ten concurrent user licenses enable access to the data base from a total of 25 PCs. The TecBOS.Tech professional module is planned to be used not only for the testing and management of all respiratory equipment, but as well all other operation tools, including chain saws and hoses. All items are registered with regard to location and service intervals in one central database, which is accessible from all three fire stations.

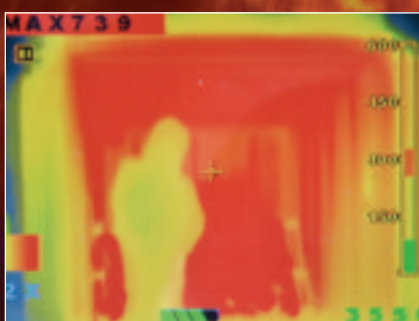
A long term scheme on equipment maintenance and replacement has been agreed upon. In their partnership, Fraport and MSA run a complete solution for SCBA equipment and management, tailored to efficiently address the specific needs.

Contact details
Jürgen Boss
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Weber gives you all the power, but it's time to think outside the box

When it comes to power and cutting performance, there's no better and stronger tool on the market than Weber Hydraulik's New RSX200-107 cutter.

With today's automotive manufacturers utilising boron made posts and TRIP steel inserts, cutting power and blade design is paramount.

The new generation of WEBER-HYDRAULIK rescue cutters are the result of continuous development to further improve the renowned reputation of WEBER-HYDRAULIK cutters, which have lead the market for many years.

As manufactures continue to improve the strength and composite of materials used within automobile construction, the demands of the rescue equipment increases with each new vehicle generation. Offering a maximum cutting force of 1050 kN (107 tons) our latest cutter, the "New" RSX200-107 ensures that the most modern materials in cars and trucks are tackled with ease.

Designed blade geometry pulls the materials to be cut, into the centre of the blade arrangement, thus always guaranteeing optimum cutting performance. Additionally to aid the cutting of round/bar material the base of the blades are equipped with an aggressive bolt cutting serration recess which enables solid material up to 43mm diameter to be cut simply and safely.

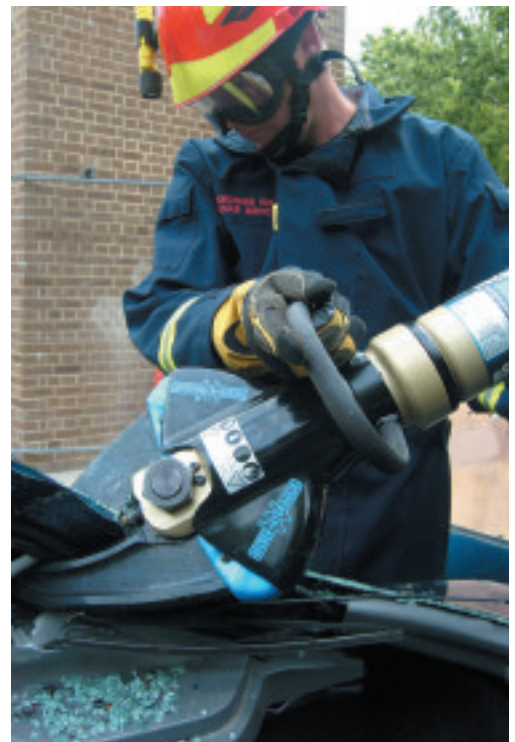
Complete with a 360° adjustable and removable handle, combined with its comparatively low weight and unique push button control, further ensures that this ultimate rescue tool is operated with ease.

Some of the unique features of the new RSX200-107 include:

- 200 mm blade opening
- new blade design for better cutting performance tested on the modern car models



The RSX200-107 cutter is packed with unique features



Weber's New RSX200-107 has aggressive blade cross-over, with immense power

and prototypes designed to cut high strength materials and constructions of A-, B and C posts

- 107 tons cutting force
- cuts 43 mm round bar
- NFPA cutting class: A8 / B9 / C8 / D9 / E9
- Weight: 19.9 kg
- single coupling

Weber Hydraulik have over 65 years' experience in hydraulic applications and have been supplying the world's fire and rescue departments with quality rescue equipment. Founded in 1939 by Emil Weber the company has remained wholly owned by the Weber family. The company employ 1100 staff and its current turnover is in excess of €210 million.

IFF

For more information please contact:

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Austria
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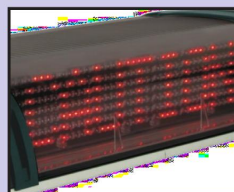
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Firefighting and rescue services:

Scores of new attractions and innovations form backbone of INTERSCHUTZ 2010

Over the six days of INTERSCHUTZ 2010, Leipzig will serve as the world capital for firefighters from across the globe. Running from 7 to 12 June, the international exhibition for rescue services, fire prevention, disaster relief and safety/security will take place in five halls as well as on the open-air site at the Leipzig Exhibition Center. As at INTERSCHUTZ five years ago in Hannover, the organizers at Deutsche Messe are anticipating over 1,000 exhibitors and attendance of considerably more than 100,000. A ratio of more than 90 percent trade visitors makes INTERSCHUTZ the ideal platform for generating business leads and deals – all the more so since the 28th German Firefighting Convention has been scheduled to run concurrently in Leipzig.

A full nine months before opening day of the event, just under 900 exhibitors from 42 nations had already registered for INTERSCHUTZ, underscoring the event's strong international appeal. With more than 430 registered exhibitors so far, Germany has the strongest contingent, followed by China, the United States, Italy and the United Kingdom. First-time exhibiting nations at next year's event include Australia, Hong Kong and Peru. The amount of display space occupied by foreign exhibitors is up 15 percent for the upcoming event. The concept of developing INTERSCHUTZ into the international exhibition for rescue services, fire prevention, disaster relief and safety/security has thus been fully validated.

A major focus at the show will be on rescue services and fire prevention, which have already registered strong exhibitor growth. Additional growth has come in the area of measuring and detection equipment.

Innovations and trends highlighted at INTERSCHUTZ 2010

The upcoming INTERSCHUTZ in June 2010 will present the current state of the art as well as the latest trends for fire prevention and disaster relief, including ultra-modern vehicles equipped with sophisticated, specially tailored communication and navigation systems as well as mission control centers that can directly transmit video images of the blaze or disaster site to vehicles underway. A special focus will consist of how rescue robots and drones can relieve crews, issue warnings and protect people in dangerous situations; they are also capable of monitoring hazardous zones and large areas. This field will also be thoroughly explored at a two-day, international fire prevention symposium, organized by the German Fire Protection Association (vfdb) and covering the latest

developments in fire risk analysis and prevention.

The area of "rescue services" will be even more strongly represented at next year's INTERSCHUTZ. At the most recent event in Hannover five years ago, some 40,000 visitors reported having a particularly strong interest in this field. At INTERSCHUTZ 2010, exhibitors from the "self" and "outside" rescue service sector will be located primarily in halls 2 and 3 as well as on the open-air site. Here, too, the number of exhibitors has gone up.

Big-name manufacturers of emergency and medical ambulances will also be back for the upcoming INTERSCHUTZ. All the major emergency relief organizations will be on hand to demonstrate their high level of expertise and training – including their perfect command of state-of-the-art medical technology and sophisticated electronic equipment. This part of the show will also be backed up by a comprehensive supporting program. At the German Rescue Services Conference, the focus is on hygiene, organizational tactics, pandemic planning and rescue squad training. The conference will once again focus on issues of direct interest to the work of rescue assistants and emergency physicians. This time the conference will clearly differentiate between medical and organizational-technical themes, staging the relevant presentations in separate auditoriums.

High-caliber supporting program

The important role of INTERSCHUTZ will be underscored by a high-caliber supporting program consisting of forums, workshops, special events and live demonstrations on the open-air site. INTERSCHUTZ offers a unique mix of commercial and non-commercial exhibitors for maximum synergy effects. Exhibitors will be displaying the latest technologies, trends and services from the areas of protection and prevention, rescue work and defense, contingency planning and organization, making INTERSCHUTZ the No. 1 international event for anyone involved in fire prevention, disaster relief, rescue services and safety/security. Further information is available at www.interschutz.de/events and www.vfdb.de

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andrea.staude@messe.de

Further information as well
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New premium-build Skum™ foam trailer monitor unveiled

Tyco Fire Suppression & Building Products has unveiled its new SKUM™ brand RAFT – which stands for Rapid Response Foam Trailer.

Designed for fast, accurate and safe deployment in high-hazard environments, the new RAFT firefighting trailers are claimed to be highly mobile, versatile and cost-effective. As standard, they are available as a single-axle 1,000-litre tank capacity unit, and as twin-axle 1,800-litre and 2,300-litre capacity trailers. They can be fitted with the latest generation of manually-operated SKUM FJM-80S or the FJM-100S fire monitors to suit specific site conditions and firefighting requirements.

The new monitors have exceptional flow performance characteristics, such as wide and adjustable flow ranges and long throw lengths – up to approximately 80 metres – to ensure fast fire knock-down. The SKUM FJM-80S monitor has a water capacity of 3,700 l/m (litres a minute) and a foam capacity of 170 l/m while, for the FJM-100S, water capacity increases to 6,000 l/m and foam capacity increases to 320 l/m.

The monitors incorporate a constant flow nozzle, so the nozzle capacity is unchanged whether it is used to deliver a fog or jet of foam or water. They can be rotated through a full 360 degrees; their vertical elevation is between minus 45 degrees and plus 90 degrees, and they can be locked in any desired operating position. These heavy-duty monitors are constructed with built-in foam concentrate inductors that ensure reliable, accurate and adjustable proportioning between one percent and six percent for all types of foam concentrate, eliminating the need for a separate proportioning system.

Both the 1,800-litre and the 2,300-litre twin-axle trailers have the option to incorporate either one or two high-capacity hose baskets designed to carry up to six 30-metre long hoses, each with a maximum diameter of 75mm. For optimum effectiveness, the recommended hose is the top-specification, abrasion and heat resistant MACRON VIKING “Type 3” that is also unaffected by contact with oil and chemicals.

Especially suited to challenging hydrocarbon processing, petrochemical, heavy industrial, military and aviation environments, the RAFT units are built to provide years of low maintenance, trouble-free service. Even in the most extreme environments, the new SKUM unit has impressively robust durability characteristics. The monitor has a stainless steel body and a bronze nozzle and bearings, and is mounted onto the unit's fully-welded tank that is fabricated from 2.5mm thick stainless steel and incorporates a 250mm diameter auto-venting,



The new SKUM™ brand RAFT foam firefighting trailers are highly mobile, versatile and cost-effective

quick-release filling lid, and 2.5mm thick internal baffle plates to minimise any surge.

The trailer incorporates a beam axle system to increase stability and reliability, and ensure its suitability for harsh locations. The stability of the new RAFT unit is further boosted by the incorporation of industrial heavy-duty, fully retractable prop stands with jacking pads on each corner, and the trailer's suspension is far more reliable over rough terrain than any other suspension system.

The units' four-way inlet manifold with one-way check valves ensures that there is no loss of water if any individual hose is punctured. This manifold is connected to the monitor via a 100mm waterway that is integrally welded inside the tank and terminates at the monitor. All of the pipe work in the tank is stainless steel to safeguard against the possibility of corrosion caused by the foam concentrate.

The trailer is fitted with a 50mm ball-hitch coupling, although other international standard towing eye connections can be supplied; the lighting and breaking system fully conforms to International standards laid down for towing trailers on public highways. The two pack epoxy paint finish gives a very durable finish to ensure long corrosion-free life in the most arduous of conditions. The SKUM range of FJM monitors are FM (Factory Mutual) approved and certified by DNV (Det Norske Veritas), Rina (Registro Italiano Navale), and BV (Bureau Veritas).

While the standard specification has been devised to suit the vast majority of applications, customer-built RAFT units can incorporate a number of optional features. These include manifold design and nozzle types and different hose and fire fighting fitting specifications.

IFF

Further information on RAFT foam trailers is available from Tyco Fire Suppression & Building Products by telephone on +44 (0) 161 875 0402, by fax on +44 (0) 161 875 0493, or via email at marketing@tyco-bspd.com. The website address is www.tyco-fsdp.com

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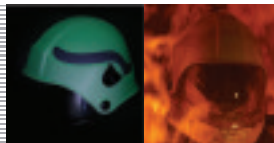
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Peli Products Safety Torches Adapting To New ATEX Standards

Is your light compliant with the European Directive regarding explosion protection?

PELI™ PRODUCTS, the global leader in the design and manufacture of advanced lighting systems and virtually indestructible case has announced that several of their safety approved torch models will fully comply with updated ATEX safety standards.

The ATEX Directive embodies the European requirements for equipment used in potentially explosive atmospheres; **changes in the standards are effective on October 1st 2009.** Designed for use in hazardous areas, professionals working in chemical, electrical, gas, oil, power, pharmaceutical, fire rescue, hazmat and other high-risk industries can be confident that Peli offers the safety approvals needed for the large variety of hazardous environments.

ATEX Standard changes affecting torches certified in Category 1&2 (Zone 0&1), are a result of Standard for Protection of Equipment by Intrinsic Safety "i" changes (from EN50020 to the new EN60079-11:2007) and Increased Safety "e" changes (from EN60079-7:2003 to EN60079-7:2007).

For more information, visit www.peli.com or <http://www.peli.com/?q=en/content/peli-lights-atex-directives>



New training posters from Holmatro

'Holmatro's Emergency Shoring & Lifting Techniques'

Holmatro Rescue Equipment introduces a new series of posters, explaining the basic principles of emergency shoring and lifting operations, as required for the safe rescue of persons trapped.

The posters series (5 posters) cover the disciplines:

- Vehicle on its side/on its roof
- Large vehicle stabilization & lifting
- Progressive lifting – Trench rescue approach
- Trench rescue: rapid safe area creation
- Collapsed structure rescue

With the help of clear full-colour illustrations all information is visible at a single glance. Therefore these posters are ideal for quick reference in a classroom or at a rescue station. The posters (size 50 x 70 cm and printed on high quality paper) are available in three languages: English, German and Dutch.

Available through your local Holmatro dealer (see: www.holmatro.com/rescue).

For more information please contact:

**Holmatro Rescue Equipment, P.O. Box 33, 4940 AA Raamsdonksveer
The Netherlands**

Tel: +31 162 58 92 00 Fax: +31 162 52 24 82

Email: rescue@holmatro.com Website: www.holmatro.com



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Pic courtesy of Reuters

Feeling safe in saf

Explanation, certification, standard – what to look out for with certificates

By Jorg Linssen

Firefighters, miners, police officers or avalanche experts – anyone who needs personal protective equipment for their work needs to be able to rely 100 percent on the quality of the same. And yet there are always some manufacturers who turn out to be black sheep. So how do I recognise whether a safety shoe complies with the standards?

In the EU, the answer is simple, in principle: Standards exist, which apply to individual protection classes in all 27 member states. If, for example, a manufacturer brings a new protective boot to the European market, it must first submit the boot for testing to a recognised test centre, such as TÜV or PFI. These test procedures are standardised and are precisely logged and evaluated by the test centre.

If the shoe passes the tests, the manufacturer is issued a so-called model certificate. The test centre signs this model certificate, which must always indicate the exact name of the tested products. Since the test centre is also answerable for the test by dint of its own registration, its ID code is printed on the model certificate and applies throughout Europe. The model test certificate must also indicate the registration and log numbers of the test centre. Fake model test certificates are frequently detected because these three numbers are inconsistent.

Customers sometimes doubt the validity of a model certificate that was issued some years

earlier. These concerns are, however, unfounded, since a model certificate retains its validity for as long as a shoe continues to be manufactured without modification. The same applies if a standard is amended. EN 345-2, for example, is the standard that governs the properties of firefighter boots, and was replaced in 2006. So while shoes that comply with the former standard do not lose their old model certificate, they do not, however, comply with the new standard, EN 15090:2006. Official bodies, such as the district governments in German federal states and the state governments in Austria, forbid the wearing of firefighter boots during assignments if these do not comply with the latest standard. As far as work safety is concerned, however, each individual company is responsible for ensuring that the staff wear safety shoes that comply with the latest standard. The current applicable standard for safety shoes is EN ISO 20345:2004 + AC:2007+A1:2007 and for work shoes EN ISO 20347:2004 + AC:2007+A1:2007 (see box).

Currently applicable standards for safety shoes in the European Union

EN ISO 20345:2007 for safety shoes

The following individual points are tested and confirmed:

SB – Basic requirements according to the standard – e.g. toe cap
 S1 – same as SB, but also includes: closed heel area, antistatic properties, energy absorption capacity in heel area
 S2 – same as S1 but also includes: compliance with the requirement for water penetration and water absorption
 S3 – same as S2 but also includes: puncture resistance and profile sole
 Meanings of additional requirements (excerpt)
 P – Penetration protection
 HI – Thermal insulation of sole complex
 CI – Cold insulation of sole complex
 E – Energy absorption capacity in heel area
 WR – Water resistance of shoes
 WRU – Water penetration and absorption of shoe upper part
 HRO – Behaviour of sole with regard to contact heat

EN ISO 20347:2007 for work shoes

The following individual points are tested and confirmed:

OB – Basic requirements and an additional requirement from the supplementary requirements
 O1 – closed heel area, antistatic properties, energy absorption capacity in heel area
 O2 – same as O1, but also includes: compliance with the requirement for water penetration and water absorption
 O3 – same as O2, but also includes: puncture resistance and profile sole
 Meanings of additional requirements (excerpt)
 P – Penetration protection
 A – Antistatic shoes
 HI – Thermal insulation of sole complex
 CI – Cold insulation of sole complex
 E – Energy absorption capacity in heel area
 WR – Water resistance of shoes
 WRU – Water penetration and absorption of shoe upper part
 HRO – Behaviour of sole with regard to contact heat
 FO – Fuel resistance of sole

ety equipment

Classification of firefighter shoes according to EN 15090:2006

Identified by the FPA logo embossed in the shoe:

Code I: Shoes made from leather or other materials with the exception of solid rubber or all-polymer shoes

Code II: Solid rubber or all-polymer shoes

Types of firefighter shoes according to EN 15090:2006

Type 1 – suitable for general technical assistance (e.g. type 1, HI1) and firefighting exclusively in the open (e.g. type 1, HI2; type 1 HI3)

Type 2 – basic heavy-duty protection, suitable for inner attack and other fires of all types; standard firefighter boot (e.g. type 2 HI2; type 2 HI3)

Type 3 – special protection version, suitable for use under extraordinary risk conditions, such as hazardous substances; also suitable for all types of firefighting (e.g. type 3 HI2; type 3 HI3)

Meaning of the code symbols (extract from EN ISO 15090:2006, Table 4)

HI1 – Thermal insulation performance of the sole complex at 150°C/30 min.

HI2 – Thermal insulation performance of the sole complex at 250°C/20 min.

HI3 – Thermal insulation performance of the sole complex at 250°C/40 min.

P – Penetration protection

T – Toe caps, if available on type 1

R – Front cap strength

Only required for type 1:

A – Antistatic shoes

I – Electrically insulating shoes

IS – Highly insulating outsoles

CI – Cold insulation of sole complex

CH – Resistance to chemicals

M – Middle foot protection

AN – Ankle protection



Safety standard embossed on a HAIX® firefighter boot – something customers can rely on from well-known brand names

Customers should not, however, just be satisfied with manufacturers who can present a model certificate that complies with the latest standard. After all, the model certificate only indicates that a test shoe complies with the European standard. A model certificate on its own says nothing about the standard production of the manufacturer. This is where a second term comes into play: conformity. Conformity means that the shoes produced for sale actually do correspond to the model for which the model certificate was initially issued. But watch out: there are two different types of documentation that confirm this conformity: a declaration of conformity and a certificate of conformity.

The certificate of conformity is issued by an impartial test laboratory. This certificate only applies for a limited period which is clearly stated by the test laboratory on the document. After that, a new certificate must be issued.

The declaration of conformity demands more faith on the part of customers. It is issued by the manufacturers themselves. By issuing this declaration, the manufacturer confirms that a product is identical to the model. Although this statement by the manufacturer is legally binding, it would seem to be worth less than a certificate of conformity at first glance. Such a declaration does, however, serve a purpose. It is demanded by major customers, above all, who require a legally binding statement from the manufacturer in addition to a certificate. A declaration of conformity issued by the manufacturer also serves a purpose, however, if it only applies to a less important component of a shoe that is modified over the course of time (e.g. appliqué sewn onto a work shoe) or if a component for which a certificate has been issued is used in a different shoe. Customers should be aware of what they are letting themselves in for if manufacturers have only issued a declaration of conformity. Especially if this declaration is based on a certificate that has expired.

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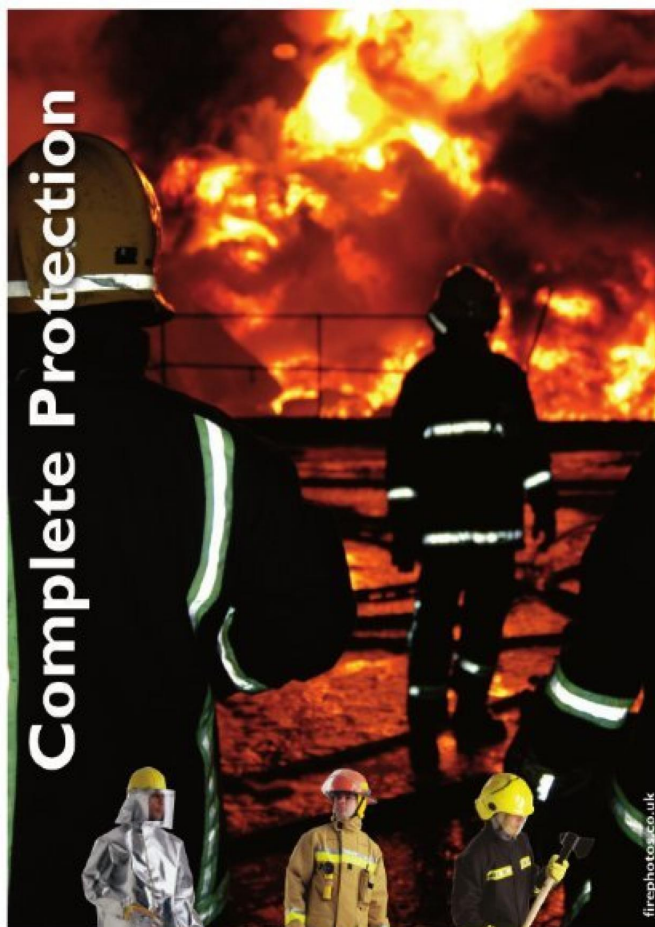


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The real world test is the most critical part of your thermal imager evaluation



Evaluating Thermal Imagers

Five Steps to Selecting the Best TI for Your Department

By Brad Harvey

Bullard Thermal Imaging Product Manager

Because thermal imagers (TIs) have quickly become a necessary tool for fire departments, the number of suppliers and models has expanded, giving fire departments (FDs) more choices than ever when it comes to choosing a TI.

Evaluators must select among several technologies, a great number of features, and a wide range of service and support offerings. With the increasing complexity of the market, many fire departments are finding it difficult to determine which thermal imager and accessories they should purchase. This article aims to provide a picture of the ideal evaluation process, which will result in your department making the best purchase decision.

Step One: team up and learn

Start by selecting a team of people to manage the TI evaluation. It is important to include people of different ranks and specialties, including an officer with decision authority as well as line firefighters who will actually be using the TI. This variety

ensures that the selected unit is the actual unit that best meets the individual department's needs.

If you have never purchased a thermal imager, take the time to learn the basics of thermal imaging. How does the technology work? What are the uses and limitations of TIs? Evaluation teams should seek advice or instruction from local departments using TIs, attend large trade shows, training seminars and even visit TI manufacturers. Be sure to verify what you are learning from as many independent sources as possible because there is conflicting and inaccurate information in the field.

If you have owned TI's in the past, take the time to familiarize yourself with the features and benefits of the latest technology. If you are expanding your current ownership, consider the capabilities of the equipment that you already

Part of any successful evaluation includes determining how easily firefighters can carry an imager as well as their normal supply of equipment



have and look for consistency of operation between a new imager and imagers that you already own. The technology in a TI improves rapidly so you should always invest some time in surveying the market prior to any purchase.

Step Two: do your homework

Initiate the homework phase by gathering information from distributors and TI manufacturers, with the goal of identifying all of the current products available. Next, get direct input from other FDs currently using different TIs. Ask how well the unit has handled the rigors of firefighting,

the value of various features on the unit and the type of service and support received from the manufacturer and/or local distributor. Ask the FD about specific manufacturer claims on options or performance to verify if the unit performs as advertised. If you are new to thermal imaging technology, you will benefit from gleaning information and learning from the experiences of a number of different FDs.

After researching what is available as well as what other FDs have found useful, develop an initial outline specifying what you believe are the critical features for a TI. Differentiate between "essential features" (such as heat and water resistance) and "desirable features" (such as 2-hour battery life). Then review the units available and determine if you can immediately eliminate any of them from your evaluation process. You may eliminate them because they lack a feature you feel is critical, or because a unit received poor reviews from other FDs. Even if you can limit the initial field to five or six TIs, the evaluation process can demand a great deal of time and resources.

Step Three: the classroom test

Once you have narrowed the field to a manageable number of potential units, it is time to gain more detailed information and first-hand experience. Schedule a day for each manufacturer or local representative (or several of them) to make a "classroom presentation." In an effort to be fair to the sales people, plan on 30 minutes per TI. This gives the sales person time to show you the features and



More than

benefits of his TIs while you gather other information, including:

- Standard and optional features available on the unit, which can include temperature measurement, telemetry, color display and others.
- Unit operating procedures, including unit activation, battery changing and charging, and use of additional features.
- Service issues, including length of warranty (be sure to clarify what it covers), availability of extended warranty as well as service turnaround.
- Performance characteristics, including durability, heat resistance, water resistance, telemetry power, etc.
- The cost of the unit, including additional features, extended warranties, accessories and spare parts.
- Support offered as part of the overall package, including training (clarify the type of training: 20 minutes of how to turn it on or two hours of how TIs work?), web resources and ongoing education.



Test features of each unit under various conditions and scenarios, including structural fire

Evaluating teams should always keep one key note in mind: there is no recognized consensus standard for TI performance. As a result, FDs should ensure that the supplier *proves* every claim he makes. If the supplier says his/her TI can stay underwater for an hour, fill up the kitchen sink and time how long it lasts. If the supplier says the TI can be tossed across the room, then clear a path and let's be honest and ethical, some may unfairly stretch the truth to win your business. To protect yourself and your department's purchase, do not accept any claim or statement as fact until the supplier proves it.



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During your evaluation, be sure to use thermal imagers in a variety of everyday tasks, including sizeup and overhaul



For convenience, attempt to schedule all presentations on the same day or the same week, with all evaluation committee members present to ask questions and document their impressions of each manufacturer. Ideally, committee members should use a checklist or table to document their conclusions and to help ensure that a fair and equal comparison is made between the TIs.

Step Four: the real world test

The real world test, or hands-on evaluation, is the most critical part of your evaluation process. While one thermal imager may stand out in the classroom, the FD's final decision could be different after firefighters get the opportunity to use thermal imagers under realistic conditions. In the evaluation, some TIs will show they look and act better in the classroom than in a real fire. Some features seem great in the classroom, but do not perform as expected once they venture into the real world of emergency response. As with the classroom presentations, aim to evaluate all of the units on the same day. This will allow each unit to be compared side-by-side in real time, under similar conditions.

Careful planning and preparation are essential to a successful hands-on evaluation. Before the evaluation, decide how you will test the features that mean the most to your department, and develop a checklist to make sure that committee members are using the same criteria. Test each feature of the unit under various conditions and scenarios, such as live fire, simulated hazmat incidents, fire-alarm investigation and outdoor searches. Crawl with each unit; look under objects. Determine if the TI can be carried up a ladder easily, or if a hose team can advance a line while carrying the TI. Always evaluate TI's under real fire conditions if possible. This is where the performance of the TI is most critical and where you should spend some time evaluating.

Have each member write notes about each TI immediately after they use it. To help quantify the evaluation process, members should be encouraged to rank specific factors using a number scale. Develop the scale and factor sheet in advance, grading such aspects as ease of use,

performance in a fire, ability to carry other equipment, etc.

Step Five: the decision

Following the completion of the classroom and hands-on evaluations, it is time to decide which thermal imager best meets the department's needs. Compare the written notes and total the scored rankings. If there are specific features that are more valuable, you may want to consider weighing them more heavily. Remember to include non-tangible issues such as service and support, which will not only help you get your units into operation, but will also assist you in keeping them in service for years to come. Consider exactly how repairs are handled and the overall support you will receive. Do not forget the information you gathered from other FDs about their experiences with TIs. Your neighbor may be the best proof of what happens after you sign the purchase order.

Once you have determined which TI you will purchase, place your order or formulate the tender documents. The distributor or manufacturer can help you write appropriate tender specifications.

Conclusion

Despite the wider acceptance of TIs in the fire service, there is still much misinformation and misunderstanding about the technology. The reality is that TIs are still expensive tools. As a result, potential buyers must perform the proper amount of preparation and evaluation to ensure that they purchase the best overall value possible. Remember that value is not just price. Purchasing cheaper TIs may seem like a bargain, until those TIs are repeatedly out of service or sitting in compartments because the line firefighters find them awkward or unusable. Like any other capital expenditure, FDs should expect their units to provide years of reliable service. To do this successfully means selecting the TI with the best design and features, best record of accomplishment in real world performance and best possible service and support. It is not easy to make a proper selection effort, but time well spent on the process will ensure that the FD and the public it serves will reap long-term benefits from these valuable tools.

IFF

Brad Harvey is the Thermal Imaging Product Manager at Bullard. He is a veteran of public safety as a firefighter, police officer and paramedic and is certified through the Law Enforcement Thermographers' Association (LETA) as a thermal imaging instructor. Harvey has worked as a high-angle rescue instructor and is a certified rescue technician and fire instructor. If you have questions about thermal imaging, you may e-mail him at brad_harvey@bullard.com

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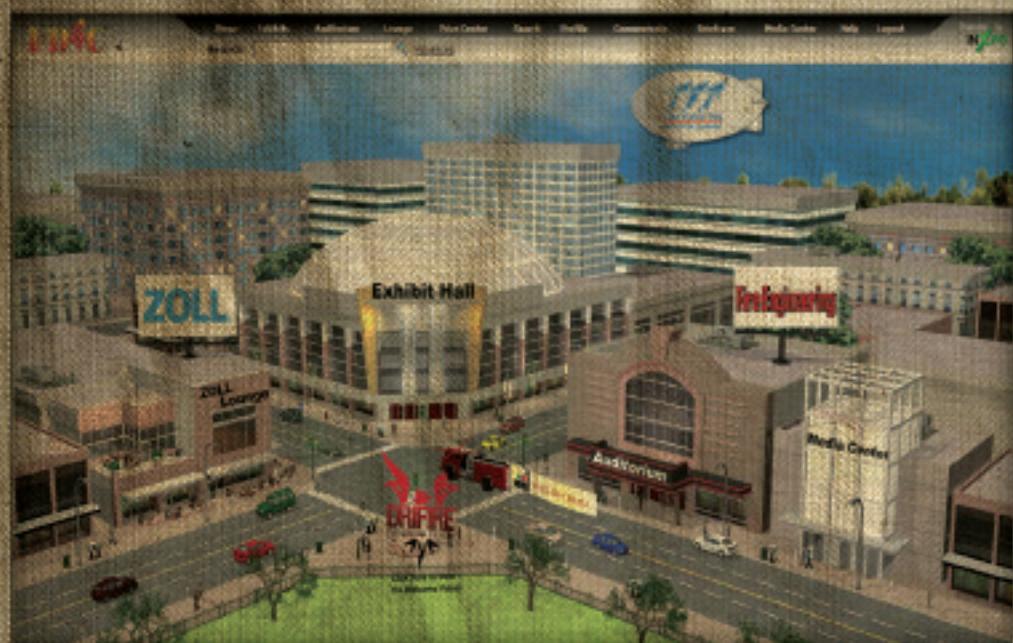
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PPV Equipment Focus

IFF takes a look at some of the recent developments in PPV technology

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Euramco Safety is an ISO-9000 Company with headquarters and manufacturing in Spring Valley, CA, a sales and distribution office in Luxembourg and sales outlets throughout the world.

For more information contact:

Euramco Safety at

theteam@euramcosafety.com

or tel: +1 (619) 670-9590

or fax: +1 (619) 670-7345



Groupe Leader release two new products

GROUPE LEADER is seeking to revolutionise fire fighting in the UK with two new products.

Many Brigades use Positive Pressure Ventilation (PPV) fans to clear smoke logged buildings AFTER the fire has been extinguished.

But that could all change as Le Havre-based Groupe Leader has designed the Easy Pow'Air ventilator which can be used DURING fire fighting operations.

Use of the compact Easy Pow'Air reduces the risk of backdrafts, speeds up search and rescue operations and provides crews with greater visibility of actual seats of fire, thereby allowing them to quickly tackle the fire. Such actions also reduce the resultant carbon footprint and the amount of water damage.

Effective up to 6 metres, the fan also gives firefighters more room to manoeuvre, and its low noise level output ensures clear communications between command and front line Firefighters.

The fan tilts between -10 and +20°, making ventilation possible in varied situations such as raised doorways, high windows, stepped entries, landings and basements.

Many problems with traditional PPV such as high maintenance, noise output, fuel cut outs and manual handling have been engineered out of the Easy Pow'Air



to make this probably the most advanced and stable fan in the market today.

Groupe Leader is also behind a new state-of-the-art search and rescue location system.

Audio ResQ uses exceptionally sensitive seismic probes to triangulate the exact position of the victims of building collapse or earthquakes.

The easy to use, plug and play device can detect the slightest noises or vibrations created by those buried alive while adjustable electronic filters reduce disturbances caused by drills, passing vehicles and even rain, making the Audio ResQ an essential part of the Search and Rescue kit.

For more information contact:

Leader Group UK Ltd

195 Allport Road, Bromborough

Wirral CH62 6 BA

Tel: +44 (0) 1513 340 202

Fax: +44 (0) 1513 461 057

Contact: Robert McCaa

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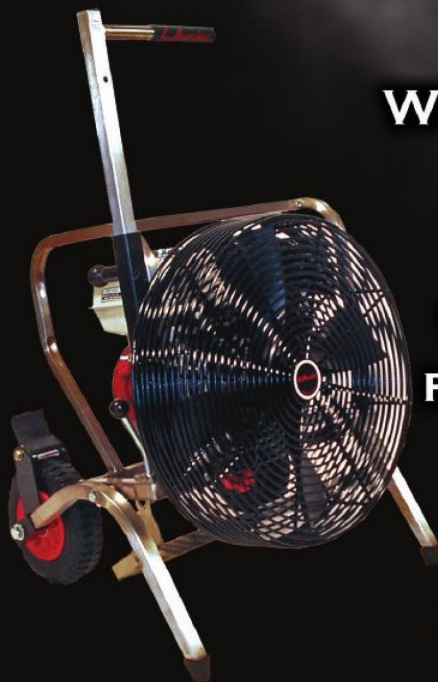
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Tempest Technology Mission Statement

TEMPEST TECHNOLOGY CORPORATION's mission is the promotion of the use of air as a tool for eliminating hostile interior environments encountered by firefighters, rescue teams, industrial workers, and industrial contractors worldwide.

This mission will be accomplished by identifying opportunities where Positive Pressure Ventilation and other ventilation techniques can be applied to make a work or emergency environment safer and educating manufacturers, distributors, and end users through live demonstrations and professional training programs.

Tempest will continually improve and expand its existing product line to meet the needs of its customers in various domestic and international markets. In order to fully use the strength of its resources and worldwide distribution system, Tempest will develop strategic partnerships, add complementary product lines, and engage in private labeling agreements with other manufacturers.

Positive Pressure Ventilation = Increased Safety for Fire Fighters

Tempest Technology Corporation was founded in 1987 to develop positive pressure ventilation tools for fire fighters. The first Tempest Power Blowers were used by fire brigades in the United States to ventilate smoke and heat from burning buildings after the fire had been extinguished. By placing the blower on the outside of the structure, blowing inward, they are able to quickly remove the smoke, heat, and dangerous gases. This allows them to locate victims faster, put out the fire faster, and it creates a safer environment for fire fighters to work within.

Over the past 22 years, Tempest has successfully promoted the concept of PPV around the world and it has become an accepted fire fighting technique in many countries in Europe, Asia, the Middle East and the Americas. In many countries, positive pressure ventilation is being used for aggressive fire attack using a technique called, "Positive Pressure Attack" or PPA. Tempest has played an important role in supporting the testing and research of new positive pressure ventilation applications such as PPA.

Tempest Technology offers a wide range of gasoline and electric powered blowers to meet your specific emergency ventilation needs. Tempest blowers are available with petrol or electric motors in sizes ranging from 400mm (16") diameter to 900mm (36") diameter. Explosion proof motors are also available.

The latest addition to the Tempest line of ventilation products is the Mobile Ventilation Unit (MVU). It is a 1250mm (48") diameter fan for ventilating large structures such as highway tunnels, underground tunnel systems, and high rise buildings. It applies the principles of positive pressure ventilation on a very large scale. Capable of airflow of over 221,000 cubic meters per hour (130,000 cfm), the Tempest MVU can quickly and efficiently ventilate any large structure. The MVU can be mounted onto a truck, trailer, or skid for easily deployment to the incident scene.



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UNIFIRE Positive Pressure Ventilation fans are built from the ground up to be the most stable, reliable, and efficient ventilation fans available. Designed specifically for the fire and rescue industry, Unifire positive pressure ventilation fans feature rubber feet that grip even the most slick of surfaces and allow for stand-alone operation.

The lower-frame of Unifire positive pressure ventilation fans features a special angle that raises the upper body of the frame, 7 inches above the ground. This feature allows the fan to clear fire hose, steps, and curbs that otherwise would be in the way. The lower frame of the Unifire positive pressure ventilation fan also features a patented friction lock mechanism. This allows the ventilation fan to be tilted from a negative ten degrees to a positive twenty degrees and locked in any position between.

The upper-frame of Unifire positive pressure ventilation fans is fully wraps the motor and is constructed with ninety-degree angles in mind. The use of ninety-degree angles helps to protect the fan in the event where they are tipped or dropped.

Unifire positive pressure ventilation fans feature an open shroud design. This allows air to be entrained from the side's top and bottom of the shroud instead of just the back, which is the case with a closed shroud design. With an open shroud design Unifire positive pressure ventilation fans can be placed closer to an opening than closed



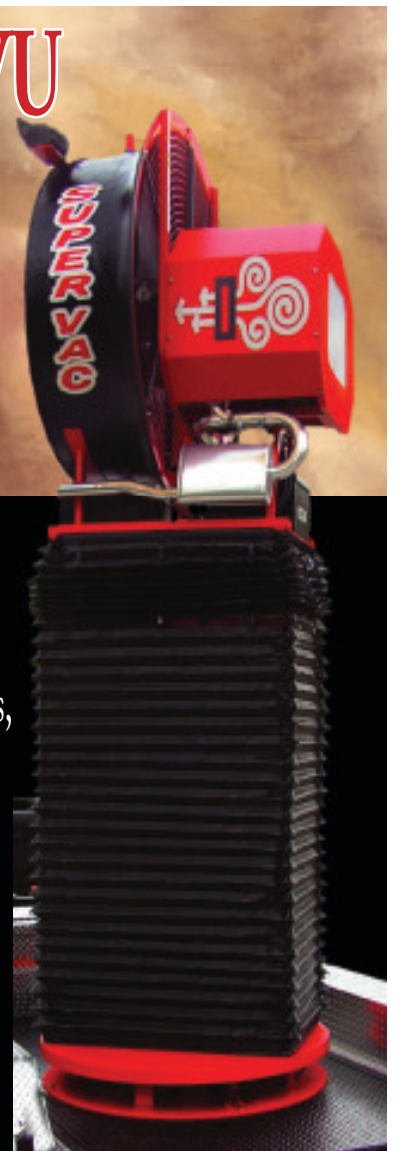
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shroud counterparts, allowing the use of them on stoops or smaller spaces where a positive pressure ventilation fan would not be usable. Instead of developing the cone of air from the front of the shroud forward, Unifire positive pressure fans develop the cone of air from the blades.

Unifire uses a composite material called Unitron on all of the blades of their positive pressure ventilation fans. This material is very robust and can withstand high heat conditions and is shatterproof. Unifire gives their Unitron blades a limited lifetime warranty against any and all defects in quality of manufacture, materials, and workmanship.

Unifire positive pressure ventilation fans are designed with a low center of gravity. This center of gravity is so low that the fan must be tipped past forty-five degrees in order to fall on its side.

Along with the standard DS series frame listed above, Unifire positive pressure ventilation fans are also available in a DST frame with no-flat wheels and a thirty-five inch extendable handle, and a DU-All frame is also available that allows electric fans to be tilted in 360 degrees.

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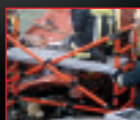
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Storage Tank Fire Protection – meeting the challenge head on

By John Allen

EMEA Marketing
Director, Tyco Fire
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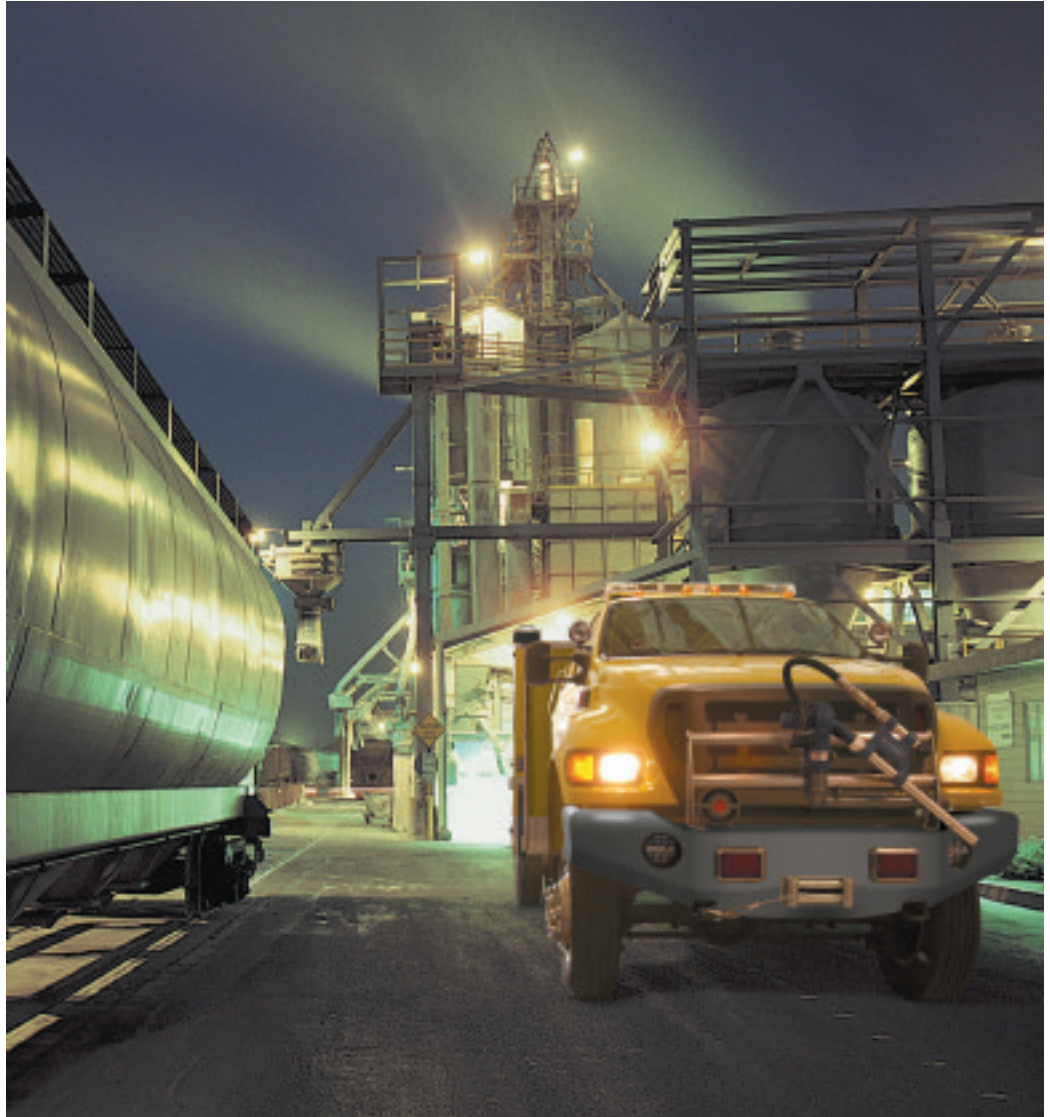
Storage tank fire safety remains a major concern throughout the petrochemicals industry. Here John Allen reviews some of the latest “front line” firefighting resources and techniques that can be easily all that stand between recovery and disaster.

Fixed foam systems are undeniably the best method of protection for storage tanks because they do not demand the hasty marshalling of emergency equipment and manpower. Much has been written on the various techniques since SKUM™ developed the first reliable storage tank fire protection solution 60 years ago. Today, systems are available for cone roof and fixed roof tanks, open-top floating roof tanks, covered floating roof tanks, and horizontal tanks.

However, storage tank fires frequently start with an explosion that may seriously damage the tank structure and nullify the effectiveness of foam generators used in fixed or “over-the-top” systems. This has led to the more widespread use of

the less vulnerable sub-surface injection and semi-subsurface injection systems for applications where there is sufficient water pressure available for their use.

In sub-surface systems, foam is introduced close to the bottom of a tank through a separate foam line and then floats to the surface to spread and extinguish the fire. However, this technique is not used on gasoline blends that contain alcohol or other polar solvent additives as oxygenates, because polar solvents destroy the foam, even where alcohol-resistant concentrates are used. Sub-surface injection also cannot be used on cone roof tanks with internal floaters, in accordance with NFPA (National Fire Protection Association) 11



(Standard for Low, Medium and High-expansion Foams). The semi-subsurface injection technique overcomes this problem. It can be used for all types of fuel and has all of the benefits of subsurface injection. This technique uses a flexible hose that is filled with foam under pressure. When the system is activated, the hose floats from the bottom of the tank to deliver the foam to the surface.

Horizontal storage tanks have been known to rupture following an explosion, so it is vital to ensure that the bund area is adequately protected. Even for larger bund areas in major tank farms, fixed low or medium-expansion generators can be used to create an effective foam blanket, with any remaining fuel in the tank being protected using a monitor. Monitors can be used to protect the bund area, but this leads to much higher foam consumption, and the recommendation is for at least two monitors to protect larger bunds to ensure complete coverage and the effectiveness of the equipment in all wind conditions.

Ensuring a sense of proportion

Firefighting foam is made up of three ingredients: water; the foam concentrate; and air. The proportioning of the foam occurs when foam concentrate is mixed with a flowing stream of water to

form a foam solution. This is mixed with air – the term normally used is aspirated – to produce foam that is a stable mass of tiny, air-filled bubbles with a lower density than oil, petrol or water, allowing it to easily flow over the surface of the fire's fuel.

Although there are several methods of proportioning, fixed foam systems typically use what is known as balanced pressure proportioning for inducing the foam concentrate into the feed water line, so called because the foam concentrate pressure is balanced with the water pressure at the proportioner inlets. This allows the proper amount of foam concentrate to be metered into the water stream over a wide range of flow rates and pressures. Because balanced pressure proportioning equipment is capable of continuously generating large volumes of foam, these systems are commonly used to protect tank farms.

There are two types of balanced pressure proportioning equipment. One type is used in foam pump systems, while the other is used in conjunction with bladder tanks. Both ensure accurate foam delivery to fire monitors and deluge systems.

The latest generation of SKUM low-pressure-drop balanced pressure proportioners for foam pump systems come in both standard and wide-flow designs that typify the performance of

proportioners currently available on the market. The wide-flow proportioner has an orifice, the area of which changes in relation to the flow, ensuring the correct proportioning within a wide range of flows. The new line-up includes a number of options, with capacities that span from as low as 100 litres a minute (26 US gallons a minute) to a maximum of 37,850 litres a minute (10,000 US gallons a minute), with a maximum operating pressure of 16 bar (232 psi).

They offer accurate proportioning of the foam concentrate irrespective of any variations in the flow or pressure and incorporate the facility to site-adjust the proportioning over the full performance range, up to three percent. Standard balanced pressure proportioners are available with water inlet sizes of between 50mm (two inches) diameter and 250mm (ten inches), and 100mm (four inches) and 200mm (eight inches) diameter for wide-flow range proportioners.

Bladder tank proportioners from SKUM come in a similar number of design and performance options and are the ideal solution, particularly when upgrading an existing water sprinkler system to a foam/water system. They are currently

There are two types of balanced pressure proportioning equipment. One type is used in foam pump systems, while the other is used in conjunction with bladder tanks. Both ensure accurate foam delivery to fire monitors and deluge systems.

available either as a horizontal tank with capacities spanning from 400 litres (106 US gallons) to 25,000 litres (6,600 US gallons), or as a vertical tank with a lower maximum capacity of 12,000 litres (3,250 US gallons). However, plans are in hand to introduce larger tanks in the coming months.

Currently, bladder tank proportioners, which are also available in standard and wide-flow designs, offer similar capacities to the balanced pressure proportioners for foam pump systems, but with a slightly lower top limit of 34,100 litres a minute (9,009 US gallons a minute).

Stand & deliver – the role of fire monitors

While fire monitors spend the vast majority of their lives motionless and inert, when the call to action comes, their effectiveness can easily be all that stands between recovery and disaster.

In essence, there are two types of fire monitor. The first type is the fixed monitor; a static unit that is attached permanently to pipework and is positioned to stand guard over a specific fire risk. The second type is the mobile monitor which traditionally has most frequently been employed to protect a multitude of fire risks. As the terms “mobile”



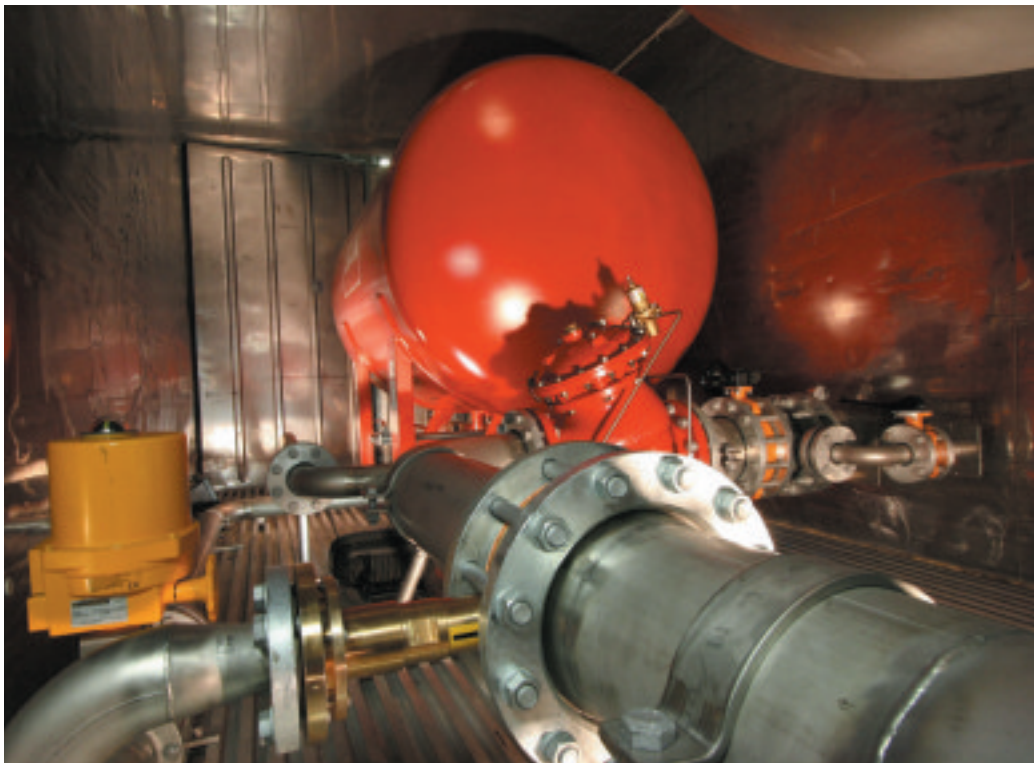
implies, they are trailer mounted for fast deployment around the site so they do require a water supply, which is usually provided by hose connection to a hydrant or portable pumps.

The decision to install fixed monitors or opt for mobile equipment is not as straightforward as it may first appear. Undeniably, a fixed monitor has the potential to be brought into action on a particular fire risk faster than a mobile unit that has to be moved and connected to a water supply. However, an explosion has the potential to disable or destroy the fixed equipment before it has even had time to spring into action. So dependency on fixed monitors can be a higher risk strategy.

Conversely, reliance on mobile monitors inevitably means some delay before firefighting can commence. It is also imperative that all of the site's possible fire scenarios are carefully assessed so that this delay is not extended while, for example, the most effective positioning of the monitors is determined. This requires careful fire planning to take into account the throw characteristics of the monitors, the proximity of hydrants, the need for hoses or pumps and possible wind conditions. Planning, therefore, is not an option – it is essential.

Frequently, the best solution is a combination of fixed and portable monitors, with fixed monitors acting as the first line of defence, and portable monitors used to protect bunds, deal with fuel spillages and vapour concentrations, and cool adjacent fire risks.

Monitors can be operated either manually by the firefighter or be remotely controlled. Remotely controlled monitors enable the firefighter to operate the equipment at a safe distance from the fire, moving the monitor in both the horizontal and vertical planes and, on the most sophisticated units on the market, adjusting the flow, stream pattern and throw. Power is hydraulic, or on the more recent models, electric. Each system has its particular benefits and SKUM, for example, offers hydraulic and electric options, as well as both manually operated and remotely controlled monitors.



Electric remote control can be supplied with explosion-proof EEx (e) and flameproof EEx (de) electrical equipment in accordance with ATEX (ATmosphères EXplosibles) guidelines for when the monitor is likely to be used in areas that may be exposed to explosive gases. These ATEX guidelines apply in Europe and are similar to the USA's NEC (National Electrical Code) guidelines.

New foam trailer monitor

One of the latest pieces of tank farm fire safety equipment to come onto the market is the new SKUM RAFT – which stands for Rapid Response Foam Trailer – firefighting foam trailer. It enables

ranges and long throw lengths – up to approximately 80 metres – means that they can be brought into action quickly, accurately and safely. The SKUM FJM-80S monitor has a water capacity of 3,700 l/m (litres a minute) and a foam capacity of 170 l/m while, for the FJM-100S, water capacity increases to 6,000 l/m and foam capacity increases to 320 l/m.

These monitors incorporate a constant flow nozzle, so the nozzle capacity is unchanged whether it is used to deliver a fog or jet of foam or water. They can be rotated through a full 360°; their vertical elevation is between -45° and +90°, and they can be locked in any desired operating

Designed for rapid response and fast, accurate and safe deployment, the new RAFT units are available, as standard, as a single-axle 1,000-litre tank capacity unit, and as twin-axle 1,800-litre and 2,300-litre capacity trailers.

John Allen is EMEA Marketing Director at Tyco Fire Suppression & Building Products.

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an effective firefighting solution for these high-hazard environments to be brought into action in the shortest possible time.

Designed for rapid response and fast, accurate and safe deployment, the new RAFT units are available, as standard, as a single-axle 1,000-litre tank capacity unit, and as twin-axle 1,800-litre and 2,300-litre capacity trailers. They can be fitted with the latest generation of manually-operated SKUM FJM-80S or the FJM-100S fire monitors to suit specific site conditions and firefighting requirements.

These particular monitors have exceptional flow performance characteristics that ensure fast fire knock-down. Their wide and adjustable flow

position. Built-in foam concentrate inductors ensure reliable, accurate and adjustable proportioning between one percent and six percent for all types of foam concentrate, eliminating the need for a separate proportioning system.

Both the 1,800-litre and the 2,300-litre twin-axle trailers have the option to incorporate either one or two high-capacity hose baskets designed to carry up to six 30-metre long hoses, each with a maximum diameter of 75mm. For optimum effectiveness, the recommended hose is the top-specification, abrasion and heat resistant MACRON VIKING "Type 3" that is also unaffected by contact with oil and chemicals.

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*Pic courtesy of
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The Frankfurt Airport Fire Service – protecting one of the world's busiest airport cities



By John A. Olsen

Senior program manager and fire and emergency services consultant for the Fire Training Center of Fraport AG Frankfurt Airport Services Worldwide, Germany

The Frankfurt Airport at a glance

Frankfurt Airport, proudly known as the gateway to Europe is one of the world's busiest international airports and is home to 102 airlines traveling to over 180 destinations worldwide.

On an average, 150,000 passenger's transient the airport each day. This equates to an annual passenger flow of 54 million. The pulsating beat of the airside is a true indication of how busy this airport is. There are 83 aircraft movements each hour or one movement every 43 seconds! The 19 km² airport city is home to more than 500 companies employing over 70,000 people. The airport, owned and operated by Fraport AG, operates three runways, each 4,000m in length, two passenger terminals, cargo centers, a general aviation terminal, medical facilities, parking garages and a large magnitude of other airport and non-airport related venues. Frankfurt

Airport is the "Home-Base" for Lufthansa, Europe's largest airline. Lufthansa operates its maintenance base in Frankfurt and has numerous aircraft hangars to include the recently constructed state-of-the-art A380 maintenance hangar. The airport has 138 flight gates and over 200 aircraft parking positions. Parking garages at the airport provide parking for more than 15,000 vehicles. Each day, aircraft are serviced with more than 17 million liters of fuel. Alone a single Boeing 747-400 can take-on approximately 216,000 liters. To maintain fueling capacity, on the airport is fuel farm consisting of 10 above-ground storage tanks with a total capacity of 186,000,000 liters of

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aviation fuel which is supplied via pipeline from the fuel storage and dispensing facilities on the Main River.

A major part of the Frankfurt Airport City is its "Cargo City South" a large industrial complex located directly south of the main operating area of the airport. Cargo City South is the home to many freight forwarders and expeditors necessary to handle the 2 million metric tons of cargo that pass thru Frankfurt each year. Currently the airport is nearing its full operating capacity of 56 million and major airport expansion projects are underway which will provide increased passenger capacity as well as increased challenges for the airport.

An airport city with such complex infrastructures and dynamic operations present unique fire and safety challenges. As we look at airports around the world, we see the effects of globalization. Airports are no longer airports . . . , globally; airports are evolving into "Airport Cities" pulsating

with major development and expansion projects. They are becoming the "Market Places of "Today's Economy" becoming the business place of major retailers, hotels, cargo forwarders, conference centers and public transportation facilities. The rapid growth and expansion of these airports is a positive reflection towards the "Globalization Move", however the move into the global future and the rapid expansion and development of our airports present special and increased challenges on our airports fire and emergency services

Meeting the challenges – the Frankfurt Airport Fire Service

About the Airport Fire Service

Protecting the 19km² airport and all of its critical infrastructure, is a great challenge that can only be achieved by staffing and operating a professionally trained and equipped fire protection organization



*Pic courtesy of
Rosenbauer*

Rosenbauer Simba 8x8
with HRET



at the airport. The airport fire service, managed by Mr. Karl-Christian Hahn, Senior Manager Airport Fire Safety & Security provides Category 10 (A380) Aircraft Rescue and Fire Fighting (ARFF) for airside operations as well as structural fire protection, hazardous materials response, technical rescue and other emergency services for all operations within the airport complex. To achieve effective and efficient levels of fire protection, the fire department is organized in four (4) separate operational branches (Operations, Fire Prevention Division, Fire Training Center and the Administrative & Support Branch), each with specific responsibilities and operational functions. In the forefront of the organization is the "Operations Branch" responsible for fire fighting and rescue activities and all other functions related to the over-all operation of the department. The fire department is currently staffed with a total of 234 employees operating out of three (3) strategically located fire stations.

The majority of the employees are assigned to the operations section which is divided into two operational shifts. Each shift is staffed with 95 fire fighters working a 24 on 24 off shift schedule. To maintain adequate levels of fire protection for the airport, a minimum of 50 fire fighters are on-duty 24/7 to staff the three fire stations. The main fire station (fire headquarters) which is located in the south-east sector of the airport has the primary responsibility for structural fire protection, hazardous materials response, technical rescue and first-responder emergency operations. Fire station one also provides support to the ARFF stations during aircraft emergencies. The primary vehicles operating out of station one are the engine-rescue units, aerial ladder, hazardous materials unit, command vehicles and other support units. On an average, fire station one responds to between 10–15 emergency calls per day. The calls range from simple fire alarm system activations to motor vehicle accidents and hazmat releases. Fortunately due to a very aggressive fire prevention and safety program at the airport, structural fires are a seldom occurrence. Fire station one also provides the infrastructure required to operate the fire department. This includes operational work areas for the testing and maintenance of self-contained breathing apparatus, hazardous materials equipment, protective clothing and support equipment.

Naturally the priority of any airport fire service is to develop and maintain a highly efficient response capability to aircraft emergencies. During an aircraft incident, seconds count and the fire department must be capable of reaching any part of the aircraft movement area within less than 3 minutes. The structural integrity of an aircraft fuselage exposed to an external fuel spill fire is dependent on how quickly the fire department can respond and react to the situation. A fire impinging

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on the aluminum skin of the aircraft fuselage is a critical situation. In less than 4 minutes, the fire can breach the aircraft skin and spread rapidly into the aircraft cabin jeopardizing the safety of the passengers. The International Civil Aviation Organization (ICAO) specifies the minimum fire protection requirements for airports based on the airport category. The airport category is based on the length of the aircraft and the diameter of the fuselage of the largest aircraft operating at the airport. For example, the Boeing 747-400 is classified by ICAO as a Category 9 aircraft requiring the airport to have a minimum of three (3) ARFF vehicles with a combined agent capacity of 24,300 liters. Frankfurt Airport is classified as a Category 10 based on the future servicing of the Airbus A-380. For Category 10, the airport is required to main-

The airport category is based on the length of the aircraft and the diameter of the fuselage of the largest aircraft operating at the airport.

tain a minimum of three (3) ARFF vehicles with a combined agent capacity of 32,300 liters and have to reach each point in the runway system in less than 3 minutes. To achieve effective response times and be capable of providing reliable fire and emergency services for the airport, the Frankfurt Airport fire department operates two (2) Category 10 ARFF Stations. (Stations 2 & 3). Each ARFF station is equipped with three (3) ARFF Vehicles (Major Crash Units), one (1) Engine-Rescue, one (1) Rescue Stairs Unit and a command vehicle. The Simba ARFF unit illustrated is the fire power in the ARFF fleet. Manufactured by Rosenbauer International, these vehicles combine state-of-the-art ARFF technology into a very powerful fire fighting machine. The vehicle has three (3) engines, 2 for the drive trains (front and rear) and one for the fire fighting system. The 49,000 kg vehicle with its 1,200 horsepower can accelerate from 0-80 km/h in 21 seconds and can travel up to speeds of up to 140 km/h. The vehicles fire fighting systems consist of a 12,500 liter water tank, 1,500 liter foam

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tank, 500 kg Dry Chemical System (Hydro-Chem™ Technology), and a 15 meter High Reach Elevating Turret (HRET). The vehicle has the capability to discharge foam/water solution at the rate of 6,000 liters per minute at 15 bar pump pressure. Additionally, each vehicle is equipped with a GPS navigation system (ETNA-Electronic Taxiway Navigation Array) and infrared cameras are mounted on the HRET. The average staffing at each of the ARFF stations is 11 fire fighters and one command officer.

Although Frankfurt Airport maintains a highly qualified and proficient airport fire service and are capable of providing efficient fire and rescue services during a major aircraft incident, they also depend on support from local municipal fire departments and rescue organizations. To effectively manage a major aircraft disaster, pre-planning and close cooperation with local emergency service organizations is essential. The Frankfurt

Airport has a comprehensive Airport Emergency Plan and response procedures in place and trains regularly with local authorities to continually evaluate the effectiveness of emergency response, communication and incident mitigation procedures. Next year, the airport will again test this plan by conducting a major airport exercise which will challenge not only the airport but also the surrounding communities and municipal fire and rescue services. Emergency response planning and maintaining high levels of readiness is Frankfurt Airports number-one priority.

Providing fire and emergency services for the airport is only one of the main responsibilities of the airport fire department. Critical to the safety of any airport is the effectiveness of the airports fire prevention program. The airport fire department operates a fire prevention and engineering division responsible for establishing and maintaining fire





A380 maintenance hangar

safety at all operational facilities and airfield operations. The fire prevention division conducts regular fire safety building inspections, provides fire and life safety design engineering reviews for all renovations and new construction projects to ensure facilities are designed and constructed with fire and life safety concepts as top priority. In addition, this section develops fire safety strategy and emergency response plans for all operational entities at the airport. At the airport there are literally thousands of portable fire extinguishers and hundreds of fire detection (with app. 50,000 smoke detectors) and fixed suppression systems (with app. 100,000 sprinkler heads). The fire prevention section manages a quality assurance program to ensure the reliability of these systems and their fire extinguisher maintenance section provides all inspection, testing and servicing of airport owned fire extinguishers. The best way to handle a fire incident is to prevent it in the first place and this . . . the fire prevention section does this well!

Train as your life depends on it . . . because it does!

The efficiency and effectiveness of any fire service organization can be directly related to the how well the fire fighters are trained. Aviation fire protection presents unique and diverse challenges for the fire fighter. Airport fire fighters not only have deal aviation incidents, they also must be properly trained and skilled to deal with a wide magnitude of domestic and industrial types of emergencies. To ensure that the department's fire fighters maintain the skills and competencies necessary to perform their duties with professionalism and competence, the Fire Training Center (FTC) was established. The FTC has two primary operational functions, training of the airports fire service and providing external training, consulting and aircraft recovery services to external customers.

Each fire fighter assigned to the airport fire department must attend a 24 week fire fighting course at the FTC. The course teaches the basic principles of fire protection, chemistry of fire, fire fighting tools & appliances, search and rescue, structural fire fighting, fire pump operations, fire prevention, vehicle rescue, hazardous materials, building collapse, fire detection and suppression systems as well as a variety of other subjects. After the basic fire fighter training, trainees then participate in a 4 week emergency medical technician training course and 2 week specialized ARFF course. Upon successful completion of the basic training, the fire fighters are then assigned to an operational shift in which they will perform 18 months of on-the-job-training (OJT). Following the OJT period, the fire fighters then obtain certification in accordance with local and state fire training standards.

FTC's global activities

The Fire Training Center (FTC) is a leading provider of fire and emergency services training, fire protection consulting and disabled aircraft recovery services to airports and fire departments across the globe. Each year over 2,500 course participants attend training programs either at the Fire Training Center in Frankfurt or at the client's location. The FTC has extensive experience in providing

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*Pic courtesy of
Rosenbauer*



John A. Olsen is the senior program manager and fire and emergency services consultant for the Fire Training Center of Fraport AG Frankfurt Airport Services Worldwide, Germany. His fire protection career has spanned over thirty-two years serving both the civilian and military fire and emergency services at locations world-wide. John's recent activities include developing and implementing fire prevention, protection and emergency response strategies at numerous international airports to include Cairo International Airport, Egypt, Burgas and Varna Airports in Bulgaria, the Indira Gandhi International Airport in New Delhi. and King Khalid and King Abdulaziz International Airports in Saudi Arabia. John and his team are currently involved in designing "state-of-the-art" fire training complexes and fire station facilities for the aviation and industrial sectors in the Middle East and Asia. Most recently, John and his staff developed and presented customized Aircraft Rescue and Fire Fighting training programs for airports in New Delhi, Czech Republic, Slovakia, Egypt and Qatar. Additionally, John is an active member of the Aircraft Rescue & Fire Fighting Working Group, International Air Transport Association Aircraft Recovery Task Force, International Aviation Fire protection Association and the European Aviation Group for Occupational Safety. John specializes in airport emergency planning, disabled aircraft recovery planning & training as well.

life & fire safety consultancy and project management services to airports and industrial organizations in different regions of the world. Our fire safety consultants perform fire hazard analyses and develop fire protection strategies for protecting facilities in the aviation, industrial and municipal sectors. With over 40 years of extensive experience, Fraport provides top-class aircraft recovery services world-wide. Our team of aircraft recovery professionals have handled a number of aircraft recoveries at its home base in Frankfurt as well as at other locations across the globe.

The expanding airport city – new challenges for the fire department

The rapid expansion at Frankfurt Airport including the construction of a the new North-West Runway (2,900 m), the future construction of a New Terminal (Terminal 3), the construction of the seven story 152,000m² Airrail Center and the expansion of Cargo City South has placed many new challenges on the airport fire service. To provide fire protection for the new runway which is expected to become operational in October 2011, the airport will construct an additional CAT 10 ARFF fire

station (Fire Station 4). This station will be equipped and staffed similar to fire stations 2 & 3. To have sufficient fire fighting personnel trained and available prior to operation of the new runway, the airport fire department is currently recruiting 44 new fire fighters, procuring 3 additional ARFF vehicles, an additional engine-rescue unit, rescue stairs and other support equipment. The opening of the new runway will significantly increase the number of aircraft movements (from 83/hr to 120/hr) which will in-turn significantly challenge the airports fire service. The airport development and expansion in the south and the future construction of the new terminal will require the relocation of the fire training center to the location of the new fire station 4. Ongoing major construction projects and increased aircraft movements at the airport present a significant increase in risk potential for construction site accidents, aircraft emergencies or other fire situations. The airports fire service is actively involved in all aspects of the airports expansion program and is prepared to handle this increased risk potential and continues to expand its emergency response capabilities. The Frankfurt Airport Fire Department . . . prepared for the worst case!

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ARFF rescue stairs

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Leeds Bradford In Airport Foam Trial

The new Rosenbauer Panther at Leeds Bradford Airport. Supplied earlier in 2009 by Angloco. Pic courtesy Mark Bathard



On the 21st October by special invitation from Ray Booth, Airport Fire Chief at Leeds Bradford International Airport, a delegation made of individuals and groups from airports and fire and rescue organisations from around the UK gathered at Leeds Airport to listen and witness a breakthrough in Fire Fighting Foam. Leeds Bradford Airport kindly lent the hosts, Angloco and Dr Sthamer Hamburg the use of their facilities and equipment for the day.

By Mark Bathard

The list of attendees was very impressive which included visitors from Cumbria Fire & Rescue Service, Devon & Somerset Fire & Rescue, South Yorkshire Fire & Rescue, Airbus UK, The Environment Agency, Westland Helicopters, Serco and Dumfries & Galloway Fire & rescue. Airports from around the UK were also in heavy attendance with representations from Edinburgh, Heathrow, Southampton, Stansted, Birmingham, Blackpool, Oxford, Coventry, East Midlands, Humberside and London Luton Airports.

The morning started with an introduction and welcome to Leeds Bradford International Airport by Ray Booth. This was followed by an introduction to Angloco headed by Alistair Brown who is the Sales & Marketing Director for Angloco. Alistair explained to the delegates that Angloco is still a family owned business founded in 1965 and currently has 70 employees. Their factory covers 35,000 sq ft and their 2009 turnover is currently £15million. Angloco's core business is the design and manufacture of fire fighting vehicles. They also specialize in the distribution of products manufactured by specialist European companies. Leeds

Bradford International Airport has recently taken delivery of a new Rosenbauer Panther ARFF vehicle supplied by Angloco.

Companies that Angloco act as distributors for include Bronto aerial ladder platforms, Gunzburger Steigtechnik ladders, Minimax dry powder fire fighting and fixed suppression systems, Rosenbauer fire fighting vehicles, Protek nozzles and monitors, Spectenhauser flood clear up pumps, Rheinmetall Defence Electronics blue light driver training simulators and Dr Sthamer Hamburg, who are the Europe's largest and the world's third largest foam manufacturer with a turnover of 31 million US\$.

The next introduction was presented by Jan Knappert who is the international sales director for Dr Sthamer Hamburg. Jan explained that Dr Sthamer is also a family owned and operated company founded in 1886 by Dr Richard Sthamer. Actual foam production started in the 1920's and they now have a staff of 42 of which nearly 25% are in research and development. Sthamer products include Foamousse, Sthamex, Sthamex-AFFF, Moussol, Fettex and wetting agents. Dr Sthamer's

ternational Is

products are used all over the world mainly in the Airport, Petrochemical, Oil & Gas, Municipal fire brigades, Industrial fire brigades, Marine and Offshore industries. Sthamer also supplies all the major German fire brigades and operate a 24/7 emergency supply operation to satisfy all possible contingencies. Jan also explained that among their customers are some very prestigious and famous names such as Mercedes, BMW, Audi, Porsche. They also supply most of the major airports in Germany including Frankfurt, Hamburg, Bremen and Leipzig to name but a few.

Jan handed over to Dr Sthamers chief chemist, Dr Matthias Prall, an expert in the field of fire fighting foams. Dr Prall explained in depth the science behind fire fighting foams and started with explaining that foam concentrates come under two categories, these are protein foam concentrates and synthetic foam concentrates. Protein concentrates include a standard protein (P) (Sthamer Foamousse 3% & 6%) of which typical uses would be in the petrochemical industries, storage tank farms and refineries. Fluoro Protein (FP) (Sthamer Fluor – Foamousse 3% & 6%) this concentrate is similar to standard protein but has additional operating activities such as in airports and sub surface response. Film-Forming Fluoro Protein (FFFP) (Sthamer Foamousse –FFFP 3% & 6%) this is similar to an FP but with an aqueous film forming on non-polar solvents. Finally, Alcohol Resistant Film Forming Fluoro Protein (FFFP-AR) (Sthamer Foamousse –FFFP-AR 3/3) this concentrate is like FFFP but a polymer film can build on polar solvents.

The second category of foam concentrates, synthetic, include foams such as AFFF, MPF, AFFF-AR and wetting agents. Multi-Purpose foam (MPF) (Sthamex f-6, f-15, f-25 and Sthamex class A) can be used in a multitude of ways and applications would include the petro chemical industries, fire brigades, airports and shipping as well as small class A and class B fires. Aqueous Film Forming Foam (AFFF) concentrates (Sthamex AFFF 1,3,6% and f-15) contain fluoro surfactants and can be inducted at rates of 1%, 3% and 6% applications include airports, class A fires and fires of non-polar liquids and solvents. The concept of AFFF is it produces an aqueous film which runs in front of the foam which means that the foam spreads quickly which means you get stable barrier against vapour re-ignition and the aqueous film means that you get a low fuel pick up. Finally, Alcohol resistant foam concentrates (AFFF-AR) (Sthamer



Sthamer Moussol FF alcohol resistant foam at 3% quickly extinguishing the pan fire. Pic courtesy Mark Bathard

Moussoul-APS 1/3, 3/3 and f-15) this is very similar to standard AFFF but it can be used on polar solvents. On polar solvents the foam produces a gel-like protective layer between the solvent and the foam which means it creates good foam expansion. A gentle application is required when using this foam as it needs to allow the formation of a coherent and tight film which glides onto the liquid surface.

Fluorine Free foams have always existed (class A and standard protein foams) but Dr Sthamer have produced a new product called Moussoul-FF 3/6 alcohol resistant fluorine free foam. This product is

**Alcohol resistant fluorine free
foam is designed to fight class
B hydrocarbon and polar
solvent based liquid fuel fires
which include Ethanol E85,
MTBE, Biodiesel, E10 and E95.**

already EN1568 and ICAO level B approved. This product is a new generation of fire fighting foam designed to combat fires involving the new Bio-Ethanol fuels and was the foam that we were all going to see demonstrated on the airfield later that morning. Quite simply, alcohol resistant fluorine free foam is designed to fight class B hydrocarbon and polar solvent based liquid fuel fires which include Ethanol E85, MTBE, Biodiesel, E10 and E95. The foam develops a polymer blanket on top of the liquid fuel surface thus preventing the vapour from re-igniting and protecting the foam bubbles from being absorbed by the alcohol. Good applications for this foam would include storage tanks and fuel spills. Dr Prall

Sthamer Moussol FF alcohol resistant foam blanket after 10 minutes still level with top of barrel. Pic courtesy Mark Bathard



finished off with an in-depth look at the actual ingredients of foam plus a brief debate about PFOS and fluorosurfactants.

After the discussions Ray Booth led us through security where we were to go airside to see just how effective this new foam would perform. There were to be four fires. Two 10ft sq pan fires and two half barrel fires. The first of the pan fires had 80 litres of Jet A1 fuel poured in with a water base and then lit and left for a pre-burn of about 2 minutes. This demonstration involved a branch pipe with a capability of 275lpm with clamp on foam tube and the UK's leading standard FFFP at a mix of 6%. After the two minutes the attack on the pan fire started and the fire was soon extinguished after about 35-40 seconds. The second pan fire was then lit again with 80 litres of Jet A1 fuel and also left to pre-burn for 2 minutes. This time however, Sthamer Moussol fluorine free 3/6 alcohol resistant foam at a mixture of 3% was to be used. After the pre-burn of 2 minutes, the attack on the fire started and before I knew it, was completely extinguished certainly within a time of less than 25 seconds. The delegates were certainly impressed with the performance of this foam especially at only 3%.

The half barrel fires then started. The first half barrel had 20 litres of a leading UK supermarkets Bio-fuel (E85) poured in lit, and left to burn for 1½ minutes. The UK's leading standard FFFP again at 6% was used from two 6litre hand held extinguishers with expansion tube. Again, the attack started and this time it looked as though it was

quenching the flames from the barrel but by the time it had eventually put the fire out, both extinguishers were spent. The second half barrel was again filled with E85 and left to burn for 1½ minutes. Two 6 litre extinguishers were used again but this time filled with a pre-mixed solution of Sthamer Moussol FF 3/6 alcohol resistant foam at the same mix of 6%. The attack started and overwhelmingly extinguished the barrel fire with foam to spare and in less time. The comparisons between the two foams were noted even more when we went back to the 10ft pan fires which had now both been out for a good 15 minutes and noted the blanketing capabilities of the Sthamer Moussol. The Moussol blanket was still thick and it was clearly evident that there was no chance of any re-ignition. The UK's leading FFFP blanket however, was starting to break apart thus creating a possible hazard for re-ignition. After about 10 minutes, the same story was evident in the half barrel fires, The Sthamer Moussol's blanket was still level with the top of the barrel whereas the UK's leading FFFP had dissipated down to the remains of the E85.

In conclusion, On behalf of myself, Angloco, Dr Sthamer and all the delegates who attended this day, a great deal of thanks must go to Ray Booth and his staff at Leeds Bradford Airport for taking the time and resources to stage these demonstrations. I was taken aback with the performance qualities of this new foam and I look forward to future demonstrations of this product. **IFF**

For more information about **Angloco**, contact Alistair Brown at +44 (0) 1924 441212 or visit www.angloco.co.uk

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Fires hazards with petroleum gas (LP



By J.C. Jones

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Propane and butane dissolved in crude oil are released on refining. Unlike methane, propane and butane can be made into a liquid at 'ordinary temperatures' by application of pressure. The result is a liquid-vapour equilibrium in which the vapour pressure is well in excess of atmospheric pressure. In fact propane alone at 25°C has an equilibrium vapour pressure nine times atmospheric. An obvious consequence of the high pressure is that this will lead to rapid exit of gas in the event of container failure. This is looked into more fully in the following section.

Effects of the high storage pressures

A related calculation, which also features in another publication by the present author,¹ is in the shaded area below.

The equation which will be applied to leakage of propane through an accidentally created orifice in a storage container is:

$$Q = AP \sqrt{\left\{ \frac{M\gamma}{RT} \right\} \left[\frac{2}{\gamma + 1} \right]^{(\gamma + 1)/(\gamma - 1)}}$$

where Q = mass flow rate of gas (kg s^{-1}), A = discharge area (m^2), P = upstream pressure (N m^{-2}), M = molecular weight (kg mol^{-1}), R = gas constant = $8.314 \text{ J K}^{-1} \text{ mol}^{-1}$,
 T = gas temperature (K) and γ = ratio of principal specific heats.

A reader is encouraged to consult other sources (e.g. Perry's Chemical Engineers' Handbook) for background on the equation and conditions for its applicability. Consider a container of LPG, approximating in composition to pure propane, at 25°C. Its pressure will be 9 bar ($\approx 9 \times 10^5 \text{ N m}^{-2}$) as noted. Imagine that a hole the size of a five pence coin develops.

Such a coin has a diameter of 18mm and an area of:

$$\pi \times 0.009^2 \text{ m}^2 = 2.5 \times 10^{-4} \text{ m}^2$$

The value of γ for propane is 1.136 the molar mass is $0.044 \text{ kg mol}^{-1}$.
Putting $P = 9 \times 10^5 \text{ N m}^{-2}$, $R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}$ and $T = 298\text{K}$ gives on substitution:

$$Q = 0.6 \text{ kg s}^{-1}$$

It is possible from this to calculate the mechanical power with which propane exits the orifice.
The pressure energy is:

$$\Delta P / \rho_{\text{liq}} \text{ J kg}^{-1}$$

where ΔP is the drop in pressure on orifice exit ($= 8 \text{ bar}$) and ρ_{liq} the liquid density ($= 493 \text{ kg m}^{-3}$).
The rate of expenditure of pressure energy is then:

$$(8 \times 10^5 / 493) \text{ J kg}^{-1} \times 0.6 \text{ kg s}^{-1} = 975 \text{ W} = 1.3 \text{ horse power}$$

Now this is about the power at which a fuel dispenser at a filling station operates. Such devices often incorporate either a $\frac{3}{4}$ h.p. or a 1 h.p. pump.¹ Our example considers release of LPG through a very small hole, and the effect of the pressure is equivalent to there being a standard petrol dispenser to aid release. This gives a perspective on the consequences in the event of leakage of the high internal pressures associated with liquefied gases.

¹The author is grateful to P. Deller of Premier Group, Nottingham UK, manufacturers of petrol pumps, for supplying this information.

liquefied G)

The calculation relates to release through an orifice. When a container of LPG breaks open catastrophically so that there is release of the entire contents in time of the order of seconds, the mechanical power due to pressure effects is of course much higher still.

Electrostatic discharge

The mechanical vigour of LPG release, quantitatively discussed in the previous section, is such that electrons are ripped off. Electrostatic effects resulting can lead to an ignition source. Static electricity effects are associated with high voltages. In a 'static effect' with clothing leading to a crackling sound, the potential difference between the fabric containing the charge and earth can be thousands of volts. The minimum ignition energy of propane vapour in air is of the order of 1 mJ. Such a quantity of energy will be obtained if a microcoulomb (μC) of charge created by electron removal passes through a potential difference of 1000 volt. These figures give a reader a 'feel' for the quantities involved and help him or her to appreciate this additional hazard when hydrocarbon liquid is moving rapidly.

Dispersion of leaked LPG

Leaked hydrocarbon will not of course necessarily ignite, and in risk assessment a probability will be assigned to ignition. When there is no ignition a hydrocarbon gas or vapour will disperse, and a stage can be reached where the concentration in air is below the lower flammability limit. Ignition is not possible beyond such a degree of dispersion. Where ignition does occur it might be immediate, as would be expected if electrostatic discharge was the cause. On the other hand release

hydrocarbon might drift a considerable distance before ignition by a source other than static electricity internally generated.

Returning to LPG in particular, mention was made above of possible catastrophic release: release of the entire contents of a vessel of LPG over a very short time. We first note that propane is considerably denser than air. The densities are actually in the ratio $44/28.8 = 1.53$. This means that propane displays *dense gas dispersion*. By contrast a gas such as ethane, which has a density only 4% higher than that of air, shows *passive gas dispersion*.

The point was also made in a previous section that the mechanical energy accompanying catastrophic release of LPG is enormous. This has the effect of sending the released material upwards against gravity so that the distribution immediately after leakage approximates to a cylinder. As dispersion takes its course the cylinder 'slumps', thereby decreasing its height and increasing its radius.

The equation for dense gas dispersion is [2]:

$$dR/dt = (c_E/R) \sqrt{[(\sigma_o - \sigma_a)gV_o/\pi\sigma_o]}$$

where R is the radius at time t , c_E = a constant, termed a 'slumping constant', having a value close to unity, σ_o = density of the cloud at time zero (kg m^{-3}), σ_a = density of air (kg m^{-3}), V_o = initial volume of the leaked material (m^3). The integrated form of the equation is:

$$R^2 - R_o^2 = 2c_E t \sqrt{[(\sigma_o - \sigma_a)gV_o/\pi\sigma_o]}$$

A related calculation follows in the shaded area below.

Consider a quantity of leaked LPG, approximating in composition to pure propane. It forms initially a cylindrical cloud of vapour of initial radius 15 m and initial height 4 m. We calculate the radius after ten seconds and after three minutes using the equation above.

For the ratio of densities we can substitute the molar weights to give:

$$(\sigma_o - \sigma_a)/\sigma_o = (0.044 - 0.0288)/0.044 = 0.35$$

Assigning the initial height the symbol H_o , other symbols as defined previously:

$$(V_o/\pi) = R_o^2 H_o = 900 \text{ m}^3 \text{ and we take } c_E \text{ to be unity, giving:}$$

$$R^2(10 \text{ s}) = 225 + 2 \times 10 \sqrt{[0.35 \times 900 \times 9.81]}$$



$$R(10 \text{ s}) = \underline{37 \text{ m.}}$$

$$R^2(180 \text{ s}) = 225 + 2 \times 180 \sqrt{[0.35 \times 900 \times 9.81]}$$



$$R(180 \text{ s}) = \underline{142 \text{ m.}}$$

In the calculation, as dense gas dispersion takes place over a ten minute period the radius of the dispersed LPG increases by almost a factor of 10. This causes envelopment of parts of the surroundings which were not affected by the initial cloud and so places them at risk.

One further point might be made in relation to the equation for dense gas dispersion when applied to LPG. We have tended in this article to approximate the composition to pure propane, but of course LPG can contain significant amounts, even a preponderance, of butane. If the above calculation is repeated for butane, for which the molar mass is 0.058 kg, the radii are respectively 39 and 155m. These differ almost insignificantly from the values for propane. If the composition, as proportions of propane and of butane, of a particular example of LPG were known the effective molar mass could of course be calculated and used in the equation, but it is doubtful whether such a refinement would be of benefit. Equivalently, one can use the molar mass either of propane or

BLEVE: that is what happens when a pressure cooker or an autoclave blows up. If when LPG leakage occurs there is ignition it will burn as a fireball, so the course of events is best described as a 'BLEVE-fireball'.

Case study: Crescent City Illinois 1970

This was the worst ever accident involving LPG and has already been recounted at some length by the present author.³ It began when there was derailment of a train pulling 12 tank cars of LPG, which were distributed amongst other types of car which the train was pulling. One of the LPG-bearing cars ruptured immediately on impact and a BLEVE-fireball resulted. Heating caused by the fireball caused some of the other LPG rail cars to start to discharge inventory through their safety valves, which were set to open at 20 bar which is just over twice the pressure at ordinary temperatures. LPG so released from one car ignited and burnt as a jet fire which extended to a nearby one and had a 'torch effect', causing it to burst open and its contents burn as a

We have tended in this article to approximate the composition to pure propane, but of course LPG can contain significant amounts, even a preponderance, of butane. If the above calculation is repeated for butane, for which the molar mass is 0.058 kg, the radii are respectively 39 and 155m. These differ almost insignificantly from the values for propane.

of butane to represent LPG generically for the purposes of a dense gas dispersion analysis.

Combustion behaviour

When LPG exiting an orifice ignites, it burns as a jet fire. Returning to our example where propane leaks at a rate of 0.6 kg s^{-1} and noting that the calorific value of propane is approximately 50 MJ kg^{-1} , a jet fire resulting from such a leak will release heat at a rate:

$$50 \text{ MJ kg}^{-1} \times 0.6 \text{ kg s}^{-1} = 30 \text{ MW}$$

A burner for natural gas and/or fuel oil at a power station would release heat at a rate comparable to this. There are empirical correlations for predicting jet fire lengths according to leakage rate,² and such a length has only a weak dependence on the orientation. The importance of flame length is that if there is impingement of the flame on to previously unaffected hydrocarbon inventory escalation will occur, as happened at Crescent City (see below).

When there is catastrophic release of LPG a BLEVE – **boiling liquid expanding vapour explosion** – is expected whether or not there is ignition. This is a consequence of the enormous mechanical energies involved in sudden release, a point noted more than once previously in this article. A BLEVE is a physical phenomenon and water can display a

BLEVE-fireball. The course of events whereby a jet flame from one tank car heated another causing it to burst open was repeated.

Concluding remarks: the non-interchangeability of LPG and natural gas

In bringing this article to a close the author will emphasise that serious consequences can result when a burner designed and adjusted for natural gas, for example at a cooker, receives LPG instead. There have been cases of this in situations where natural gas supply has been interrupted. Natural gas and propane/butane have different air requirements. More importantly, a natural gas flame propagates more slowly than a propane/butane flame making a burner for the former unsuitable for the latter. On no account should such substitution take place. **IFF**

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The ABCs, Ds, and Ks of Fire Extinguishers

By Carl McMillan

Technical Service
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Extinguishers need to be conspicuously located and available in the case of fire. They should be located along normal paths of travel and near exits.

Fire extinguishers are a common sight wherever you travel, from government buildings to businesses to restaurants. They are placed in conspicuous locations purposely so they are easy to locate in case of fire. However, even though the placement of fire extinguishers may seem obvious, there are strict guidelines and standards set forth by the Occupational Health and Safety Administration and the National Fire Protection Association. These guidelines and standards concern the classification, labeling, and location of common fire extinguishers.

Classification

Fire extinguishers are classified by the type of fire that they will extinguish.

A Class A fire extinguisher is used for ordinary combustibles, such as wood, paper, some plastics, and textiles. This class of fire requires the

anticipated workplace fires and also on the size and degree of the hazard.

A Class D fire extinguisher is used on combustible metals, such as magnesium, titanium, sodium, etc., which require an extinguishing medium that does not react with the burning metal. Extinguishers that are suitable for Class D fires should be identified by a five-point star containing the letter "D."

A Class K fire extinguisher is used on fires involving cooking media (fats, grease, and oils) in commercial cooking sites such as restaurants. These fire extinguishers work on the principle of saponification. Saponification takes place when alkaline mixtures, such as potassium acetate, potassium citrate, or potassium carbonate, are applied to burning cooking oil or fat. The alkaline mixture combined with the fatty acid creates a soapy foam on the surface that holds in the vapors

Even though the placement of fire extinguishers may seem obvious, there are strict guidelines and standards set forth by the Occupational Health and Safety Administration and the National Fire Protection Association. These guidelines and standards concern the classification, labeling, and location of common fire extinguishers.

heat-absorbing effects of water or the coating effects of certain dry chemicals. Extinguishers that are suitable for Class A fires should be identified by a triangle containing the letter "A".

A Class B fire extinguisher is used for flammable liquid and gas fires such as oil, gasoline, etc. These fire extinguishers deprive the fire of oxygen and interrupt the fire chain by inhibiting the release of combustible vapors. Extinguishers that are suitable for Class B fires should be identified by a square containing the letter "B".

A Class C fire extinguisher is used on fires that involve live electrical equipment, which require the use of electrically nonconductive extinguishing agents. (Once the electrical equipment is de-energized, extinguishers for Class A or B fires may be used.) Extinguishers that are suitable for Class C fires should be identified by a circle containing the letter "C". Employers must select and distribute fire extinguishers based on the classes of

and steam and extinguishes the fire. These extinguishers are identified by the letter K.

Labeling

Fire extinguishers are labeled so users can quickly identify the classes of fire on which the extinguisher will be effective. The marking system combines pictographs of both recommended and unacceptable extinguisher types on a single identification label. Following are examples of typical labels. Also located on the fire extinguisher label is the UL rating. The UL rating is broken down into Class A and Class B:C ratings. These numerical ratings allow you to compare the relative extinguishing effectiveness of various fire extinguishers. For example, an extinguisher that is rated 4A:20B:C indicates the following:

The A rating is a water equivalency rating. Each A is equivalent to 1½ gallons of water. 4A = 5 gallons of water. The B:C rating is equivalent to

the amount of square footage that the extinguisher can cover, handled by a professional. 20 B:C = 20 square feet of coverage. C indicates it is suitable for use on electrically energized equipment.

When analyzing these ratings, note there is not a numerical rating for Class C or Class D fires. Class C fires are essentially either a Class A or a Class B fire involving energized electrical equipment where the fire extinguishing media must be non-conductive. The fire extinguisher for a Class C fire should be based on the amount of the Class A or Class B component. For extinguisher use on a Class D fire, the relative effectiveness is detailed on the extinguisher nameplate for the specific combustible metal fire for which it is recommended.

Location

OSHA requires that employers select and distribute fire extinguishers based on the classes of anticipated workplace fires and also on the size and degree of the hazard that would affect their use. The following chart contains OSHA requirements for classes of fires and travel distance to an extinguisher. Note there is no distance requirement for Class K extinguishers. Typically they are located at the point of possible cooking fire ignition. Some

Instead of Class A portable fire extinguishers, an employer may use uniformly spaced standpipe systems or hose stations connected to a sprinkler system installed for emergency use by employees. Such systems must meet the respective requirements of 29 CFR 1910.158 or 1910.159- that they provide total coverage of the area to be protected, and that employees are trained at least annually in their use.

Training

Where the employer has provided fire extinguishers for employee use, the employer must provide an educational program to familiarize employees on the principles and use of the extinguishers. This educational program should be completed during the initial hiring and annually thereafter.

Inspections Portable fire extinguishers must be visually inspected monthly. The inspection should assure that:

- Fire extinguishers are in their assigned place;
- Fire extinguishers are not blocked or hidden; Fire extinguishers are mounted in accordance with NFPA Standard No. 10 (Portable Fire Extinguishers);

The locations of fire extinguishers must be identified so they are readily available to employees without subjecting them to injury. Height requirements for mounting extinguishers depend on the weight of the unit. If the unit weighs less than 40 pounds, it should be installed so the top of the extinguisher is no more than 5 feet above the floor.

local requirements may be stricter, so you should always check with your local fire marshal and insurance agent.

Fire Class Travel Distance

Class A 75 feet (22.9 m) or less

Class B 50 feet (15.2 m)

Class C Based on appropriate A or B Hazard

Class D 75 feet

Extinguishers need to be conspicuously located and available in the case of fire. They also should be located along normal paths of travel and near exits. Portable fire extinguishers that are not wheeled should be installed on the hanger or bracket supplied or placed in cabinets or wall recesses. The locations of fire extinguishers must be identified so they are readily available to employees without subjecting them to injury. Height requirements for mounting extinguishers depend on the weight of the unit. If the unit weighs less than 40 pounds, it should be installed so the top of the extinguisher is no more than 5 feet above the floor. If the unit weighs more than 40 pounds, it should be installed so the top of the extinguisher is no more than 3.5 feet above the floor. At no point should the extinguisher be less 4 inches from the floor.

- Pressure gauges show adequate pressure (a CO₂ extinguisher must be weighed to determine whether leakage has occurred);
- Pin and seals are in place;
- Fire extinguishers show no visual sign of damage or abuse;
- Nozzles are free of blockage.

Maintenance, inspection, and testing of an extinguisher are the responsibility of the employer. Maintenance should be done at least annually or more often if conditions warrant. The employer shall record the annual maintenance date and keep these records for one year after the recorded date or the life of the shell of the extinguisher.

Hydrostatic testing of portable fire extinguishers is done to protect against unexpected in-service failure. This can be caused by internal corrosion, external corrosion, damage from abuse, etc. Hydrostatic testing must be performed by trained personnel with proper test equipment and facilities. OSHA requires hydrostatic testing according to the schedule listed in 29 CFR 1910.157 Table L-1.

Fire extinguishers, correctly used on the type of fire they are intended for, can have a large role in stopping major fire damage and dollar losses. When walking by a fire extinguisher, you'll know that all of the letters and numbers have specific meanings and why it is located where it is.

Carl A. McMillan lives in Beloit, Wis. He has been employed for 15 years as a Technical Service Representative by Lab Safety Supply, at Janesville, Wis., direct marketer of specialized industrial and safety equipment.

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Colombian Fire Officers return to the UK

By Paul Furler

The latest stage of a ten-year project of assistance and collaboration between the Colombian Fire Service and Devon & Somerset Fire & Rescue Service took place recently. Officers from the Country once again travelled to the UK to receive Instructor training for Fire behaviour and compartment Fire fighting.

The project was initiated by the Services retired Chief Fire Officer Paul Young in 1999 but has received continued support since his appointment at the beginning of 2009 from Devon & Somerset's new Chief Fire Officer Lee Howell.

Last year International Fire Magazine reported that three Fire Officers from Devon & Somerset Fire & Rescue Service travelled to Colombia to help construct Fire behaviour and compartment fire-fighting unit in the City of Manizales, Caldas.

Nigel Snowshall, Pete Sandel and Paul Furler were in Manizales for four weeks overseeing the construction process and training assistant Fire behaviour Instructors who were to form part of the resident team to provide continuation courses for the Fire-Fighters of the region using the unit.

A contingent of Instructors from the Country's capital city, Bogotá also took part in this training with a view to eventually providing their own unit in their City.

The Officers from Bogotá indicated that it was

their intention to build a new fire training centre in the City in the near future and that they would like with our help, to include a fire behaviour unit as part of the build.

Mr Graham Leney of Transitional Fire has once again offered support to the project in the form of his technical expertise in the construction of Fire behaviour containers.

It was then decided that the best way forward would be to bring a team of the prospective Instructors to the UK to take part in a dedicated Fire behaviour Instructor course at Devon's Breathing apparatus and Fire behaviour training Centre at Exeter in Devon.

It also made sense to use our previously trained Instructors from Manizales to assist with the course, as their knowledge, skills and command of the Spanish language would be invaluable.

Fire Officers Hector Gonzales and Diego Moreno were therefore invited to attend by the Bogotá Fire service and gladly agreed to form part



of the Instruction team here in the UK.

All but one of the five strong Bogotá part of the team had taken part in the Manizales course in 2008 and had been trained to assist with container sessions but had predominantly acted as students during Hector and Diego's Instructor training there. It was very important therefore for the Bogotá Officers to be proficient as Instructors in their own right at some time before construction eventually takes place in their city. The team, led by Bogotá's Officer in charge of training Mr Pedro Higuera arrived in the UK during the first week of September 2009 and were in the country for four weeks of intensive 'one to one' training.

After an introduction to the new member of the UK team, Fire behaviour Instructor John Gilhooley the first week of training started with the team being given a basic initial familiarisation of the AGA BA set used by Devon & Somerset and

an introduction to UK BA control procedures. This was achieved by way of a number of confidence building search and rescue exercises in both darkness and cold smoke.

The emphasis on safety in all aspects of the UK Fire service, but particularly in the use of breathing apparatus has always been the catalyst for the Colombian Fire Service's keen interest in our training and procedures, and so it was no surprise that this initial phase of training prompted considerable discussion and debate.

The fire behaviour element of the training started with Hector and Diego delivering a series of lectures in Spanish to refresh the Instructor students prior to the course starting in earnest at the beginning of week two.

The Colombian FBI course was scheduled to run alongside a UK FBI course for prospective Instructors from a number of Brigades and an initial Fire-fighter Breathing apparatus course for new local recruits at Devon & Somerset's busy training centre at Exeter Airport.

The second week of the course started with FB Instructors Nigel Snowshall and Paul Furler running a demonstration container, once again to refresh the practical knowledge delivered the previous year in Manizales.

Various experiments to demonstrate the chemistry of combustion, fire development and the flammability range of fire gases that it was not possible to re-produce in Colombia were included as part of the next theoretical element of the training.

Branch techniques were then refreshed prior to the first introduction to the attack containers.

An 'Attack 1' fully ventilated session was run, again ensuring that the Colombian Officers were acting as students but integrating Hector and Diego as lead Instructor with a UK Instructor mentoring during the session.

The following days included a reduced ventilation 'Attack 2 session' run on the same format with Hector & Diego taking the lead followed by a 'Window session' to demonstrate 'Back draft' conditions, and additionally to demonstrate that by using the correct branch techniques an impending





back draft can be prevented.

The third week consisted of a number of Demonstration, Attack 1 and Attack 2 sessions with the Bogotá Instructors gradually taking the role of lead Instructor with a mentor to assist in each session. In addition the Bogotá Instructors were given syndicate work and theory lectures to deliver to their colleagues.

The week culminated in a full-blown exercise to practice compartment Fire fighting using all the techniques learnt in a realistic scenario in the 'Villa'.

The Villa consists of a number of shipping containers welded together to form a building of two floors with multiple inter-connecting compartments on each floor. The students had to deal with live carbonaceous fires and the associated fire gases using correct door entry procedure, correct branch techniques and methodical search & rescue techniques while under the strict UK Breathing apparatus control procedures.

When each Instructor had demonstrated that they could safely run and supervise each of the three container sessions and deliver the necessary theory input they were deemed to be competent to deliver training up to and including Attack 2. It was strongly advised that these skills will need to be refreshed and practiced 'in house' prior to live training with students taking place in Bogotá, particularly if the Training Centre construction time is lengthy.

Certificates to acknowledge the skills that had been acquired during their stay were presented to the Officers by Devon & Somerset's Deputy Chief Fire Officer Neil Gibbons at a presentation ceremony at the Services Headquarters.

It has been agreed that Officers from Devon & Somerset will travel to Bogotá to assist with the construction of the Fire behaviour containers and compartment fire training unit and also to deliver the initial courses to be run in the city during 2010.

Thanks must go to all the staff at Devon & Somerset Fire & Rescue Service's Breathing apparatus and Fire

behaviour training centre led by GM Tam Alford who all gave their expertise, support and time to enable the project to be fitted in to the departments busy schedule and to move forward once again.

It was particularly gratifying to learn that as a result of the training received by our colleagues in Manizales during 2008 and under the leadership of FBI Hector Gonzales a team of his assistant Fire behaviour Instructors were able to safely deal with a serious fire in the city using compartment fire-fighting techniques.

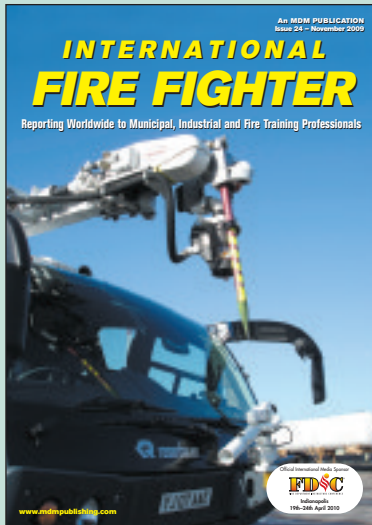
A serious fire on the 12th floor of a high rise building had caused heavy smoke logging down to the 9th floor, his team progressed to the fire floor and safely and successfully extinguished the fire using their acquired knowledge of fire behaviour and the correct branch techniques. **IFF**



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